All India Test Series (2023-24)

Test Code: ANY/01 | **AITS TEST - 01** | **YAKEEN NEET**

DURATION: 200 Minutes | **DATE: 26/11/2023** | **M. MARKS: 720**

ANSWER KEY

PHYSICS

SECTION-A

1.	(2)	8.	(1)	15.	(2)	22.	(1)	29.	(1)
2.	(2)	9.	(2)	16.	(4)	23.	(4)	30.	(2)
3.	(4)	10.	(1)	17.	(4)	24.	(2)	31.	(3)
4.	(4)	11.	(4)	18.	(3)	25.	(2)	32.	(3)
5.	(1)	12.	(3)	19.	(1)	26.	(4)	33.	(2)
6.	(2)	13.	(2)	20.	(4)	27.	(1)	34.	(1)
7.	(4)	14.	(1)	21.	(2)	28.	(3)	35.	(1)

SECTION-B1

36.	(3)	39.	(4)	42.	(3)	45.	(1)	48.	(1)
37.	(3)	40.	(4)	43.	(2)	46.	(2)	49.	(2)
38.	(2)	41.	(1)	44.	(3)	47.	(4)	50.	(3)

CHEMISTRY

SECTION-A

51.	(2)	58.	(1)	65.	(4)	72.	(1)	79.	(3)
52.	(3)	59.	(4)	66.	(2)	73.	(1)	80.	(1)
53.	(3)	60.	(3)	67.	(2)	74.	(3)	81.	(2)
54.	(3)	61.	(1)	68.	(2)	75.	(2)	82.	(1)
55.	(3)	62.	(2)	69.	(1)	76.	(2)	83.	(2)
56.	(3)	63.	(1)	70.	(4)	77.	(3)	84.	(3)
57.	(4)	64.	(2)	71.	(2)	78.	(3)	85.	(2)

SECTION-B

86.	(3)	89.	(1)	92.	(3)	95.	(4)	98.	(2)
87.	(4)	90.	(1)	93.	(2)	96.	(2)	99.	(2)
88.	(2)	91.	(1)	94.	(3)	97.	(3)	100.	(3)

BOTANY

SECTION-A

101.	(4)	108.	(3)	115.	(1)	122.	(3)	129.	(2)
102.	(2)	109.	(2)	116.	(1)	123.	(2)	130.	(2)
103.	(2)	110.	(1)	117.	(4)	124.	(3)	131.	(1)
104.	(1)	111.	(4)	118.	(2)	125.	(4)	132.	(1)
105.	(2)	112.	(4)	119.	(1)	126.	(2)	133.	(1)
106.	(2)	113.	(1)	120.	(2)	127.	(2)	134.	(2)
107.	(4)	114.	(2)	121.	(1)	128.	(3)	135.	(1)

SECTION-B

136.	(3)	139.	(1)	142.	(3)	145.	(4)	148.	(1)
137.	(4)	140.	(4)	143.	(2)	146.	(2)	149.	(2)
138.	(2)	141.	(2)	144.	(1)	147.	(2)	150.	(1)

ZOOLOGY

SECTION-A

151.	(2)	158.	(1)	165.	(4)	172.	(2)	179.	(2)
152.	(1)	159.	(1)	166.	(2)	173.	(1)	180.	(2)
153.	(2)	160.	(2)	167.	(3)	174.	(2)	181.	(2)
154.	(3)	161.	(2)	168.	(3)	175.	(4)	182.	(2)
155.	(3)	162.	(2)	169.	(2)	176.	(4)	183.	(3)
156.	(4)	163.	(3)	170.	(3)	177.	(3)	184.	(3)
157.	(3)	164.	(2)	171.	(3)	178.	(1)	185.	(2)

SECTION-B

186.	(1)	189.	(3)	192.	(3)	195.	(3)	198.	(3)
187.	(2)	190.	(2)	193.	(4)	196.	(2)	199.	(4)
188.	(4)	191.	(3)	194.	(1)	197.	(2)	200.	(1)

Hints and Solution

PHYSICS

SECTION-A

1. (2)

Given $f(x) = (x^2 + 2x - 15)\,x$

$f(x) = x^3 + 2x^2 - 15x$

$f'(x) = 3x^2 + 4x - 15$

For max or min, $f'(x) = 0$

$3x^2 + 4x - 15 = 0$

$3x^2 + 9x - 5x - 15 = 0$

$3x(x + 3) - 5(x + 3) = 0$

$(3x - 5)(x + 3) = 0$

$x = \frac{5}{3}, -3$

$f''(x) = 6x + 4$

$f''(x)$ at $x = \frac{5}{3} = 6 \times \frac{5}{3} + 4 = 14 > 0$

$f''(x)$ at $x = -3 = (6 \times -3) + 4$

$= -18 + 4$

$= -14 < 0$

So, $f(x)$ will be minimum at $x = \frac{5}{3}$

$f(x) = (x - 3)(x + 5)\,x$

$f\left(\frac{5}{3}\right) = \left(\frac{5}{3} - 3\right)\left(\frac{5}{3} + 5\right)\frac{5}{3}$

$= -\frac{4}{3} \times \frac{20}{3} \times \frac{5}{3}$

$= \frac{-20 \times 20}{27} = -\frac{400}{27}$

2. (2)

Using $v = u + at$

$0 = \sqrt{3}V - at$

$t = \frac{\sqrt{3}V}{a}$ ……(i)

$\mu mg = m \times a$ ……(ii)

From (i) and (ii) $t = \frac{\sqrt{3}V}{\mu g}$

(New NCERT; 11th; Page No.-60)

3. (4)

$\int \sin(3x + 5)\,dx = -\frac{1}{3}\cos(3x + 5) + constant$,

comparing with $= -\frac{1}{a}\cos(3x + b)$ we get $a = 3$ and $b = 5$

4. (4)

$I_1 = \int_0^2 \sqrt{2x}\,dx$

$= \left|\sqrt{2} \times x^{\frac{3}{2}} \times \frac{2}{3}\right|_0^2$

$= \left[\sqrt{2} \times 2^{\frac{3}{2}} \times \frac{2}{3} - 0\right]$

$= 2^2 \times \frac{2}{3}$

$= \frac{8}{3}$

5. (1)

$y = 25x^2 + 7 - 11x$ ……(i)

$\frac{dy}{dx} = 50x - 11$

For maxima or minima, $\frac{dy}{dx} = 50x - 11 = 0$

$x = \frac{11}{50}$

$\frac{d^2y}{dx^2} = 50 > 0$

$\Rightarrow y$ has minimum value at $x = \frac{11}{50}$

Substituting $x = \frac{11}{50}$ in eqn (i) we get

$y = 25 \times \frac{121}{2500} + 7 - \frac{11 \times 11}{50}$

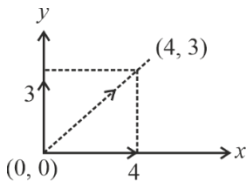
$= \frac{121}{100} - \frac{121}{50} + 7$

$y = \frac{-121}{100} + 7$

$y = \frac{-121 + 700}{100}$

$y = 5.79$

6. (2)



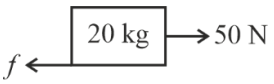
$\frac{y-3}{x-4} = \frac{0-3}{0-4}$

$\frac{y-3}{x-4} = \frac{3}{4}$

$4y - 12 = 3x - 12$

$4y = 3x$

7. (4)



$fs = 0.4 \times 20 \times 10$ as $N = mg$ and $\mu = 0.4$

$= 80$ N

$50 \text{ N} < 80 \text{ N}$

So, friction will be 50 N only and the block will not move, hence acceleration = 0 m/s^2

(New NCERT; 11th; Page No.-60)

8. (1)

$\vec{b} \times \vec{c} = \begin{vmatrix} \hat{\imath} & \hat{\jmath} & \hat{k} \\ 1 & 2 & -2 \\ 2 & 3 & 0 \end{vmatrix}$

$= \hat{\imath}(0 + 6) + \hat{\jmath}(-4) + \hat{k}(3 - 4)$

$\vec{b} \times \vec{c} = 6\hat{\imath} - 4\hat{\jmath} - \hat{k}$

$\vec{a} \times (\vec{b} \times \vec{c}) = \begin{vmatrix} \hat{\imath} & \hat{\jmath} & \hat{k} \\ 2 & 1 & 3 \\ 6 & -4 & -1 \end{vmatrix}$

$= \left[\hat{\imath}(-1 + 12) + \hat{\jmath}(20) + \hat{k}(-8 - 6)\right]$

$= \left[11\hat{\imath} + 20\hat{\jmath} - 14\hat{k}\right]$

(New NCERT; 11th; Page No.-101)

9. **(2)**

$\vec{A}.\vec{B} = |\vec{A}||\vec{B}|cos30^0$

$|\vec{A} \times \vec{B}| = |\vec{A}||\vec{B}|\, sin\, 30^0$

$\frac{\vec{A}.\vec{B}}{|\vec{A}\times\vec{B}|} = \frac{cos\,30°}{sin\,30°} = cot30^0 = \sqrt{3}$

(New NCERT; 11th; Page No.-101)

10. **(1)**

$\vec{A} + \vec{B} = 5\hat{\imath} - 4\hat{\jmath} + 7\hat{\imath} + 8\hat{\jmath}$

$= 12\hat{\imath} + 4\hat{\jmath}$

$|\vec{A} + \vec{B}| = \sqrt{12^2 + 4^2}$

$= \sqrt{144 + 16}$

$= \sqrt{160}$

$= 4\sqrt{10}$

$\theta = \tan^{-1}\frac{4}{12} = \tan^{-1}\frac{1}{3}$

(New NCERT; 11th; Page No.-33)

11. **(4)**

$\vec{A} = (\hat{\imath} + \hat{k}), \vec{B} = \hat{\jmath} + 3\hat{k}$

$\vec{A}.\vec{B} = (\hat{\imath} + \hat{k}).(\hat{\jmath} + 3\hat{k})$

$|\vec{A}||\vec{B}| \cos\theta = 0 + 0 + 0 + 3$ ……(i)

$|\vec{A}| = \sqrt{2}$ ……(ii)

$|\vec{B}| = \sqrt{1+9} = \sqrt{10}$ ……(iii)

From (i), (ii), and (iii)

$\sqrt{2} \times \sqrt{10}\cos\theta = 3$

$\cos\theta = \frac{3}{\sqrt{20}}$

$\theta = cos^{-1}\frac{3}{\sqrt{20}}$

(New NCERT; 11th; Page No.-71)

12. **(3)**

Vector is $[3\hat{\imath} - \hat{\jmath} + 2\hat{k}]$

Magnitude of vector

$= \sqrt{9 + 1 + 4}$

$= \sqrt{14}$

Angle made by x-axis = $\alpha = \cos^{-1}\frac{3}{\sqrt{14}}$

Angle made by y-axis = $\beta = \cos^{-1}\frac{-1}{\sqrt{14}}$

Angle made by z-axis = $\gamma = \cos^{-1}\frac{2}{\sqrt{14}}$

(New NCERT; 11th; Page No.-31)

13. **(2)**

$\vec{B} = \hat{\imath} - 3\hat{\jmath} + 2\hat{k}$ $\vec{A}$= ?

$\vec{C} = 3\hat{\imath} + 5\hat{\jmath} - 4\hat{k}$

$\vec{A} + \vec{B} + \vec{C} = \hat{\jmath} \rightarrow$ {given}

$\vec{A} + \hat{\imath} - 3\hat{\jmath} + 2\hat{k} + 3\hat{\imath} + 5\hat{\jmath} - 4\hat{k} = \hat{\jmath}$

$\vec{A} + 4\hat{\imath} + 2\hat{\jmath} - 2\hat{k} = \hat{\jmath}$

$\vec{A} = \hat{\jmath} - 4\hat{\imath} - 2\hat{\jmath} + 2\hat{k}$

$= -4\hat{\imath} - \hat{\jmath} + 2\hat{k}$

(New NCERT; 11th; Page No.-33)

14. **(1)**

$|\vec{A}|\, cos\,\theta = \frac{\vec{A}.\vec{a}}{|\vec{a}|}$

$= \frac{(5\hat{\imath}+2\hat{\jmath}-2\hat{k}).(\hat{\imath}-\hat{\jmath}-\hat{k})}{\sqrt{1+1+1}}$

$= \frac{5-2-2}{\sqrt{3}}$

$|\vec{A}|\, cos\,\theta = \frac{1}{\sqrt{3}}$

(New NCERT; 11th; Page No.-71)

15. **(2)**

$L = F^a A^b M^c$

$L = [MLT^{-2}]^a\ [L^2]^b\ [M]^c$

$L = M^{a+c} L^{a+2b} T^{-2a}$

$a + 2b = 1$ ……(i)

$a + c = 0$

$-2a = 0$

$a = 0$ ……(ii)

$c = 0$ ……(iii)

From (i) and (ii) $a + 2b = 1$

$2b = 1$

$b = ½$

$L = F^0 A^{1/2} M^0$

(New NCERT; 11th; Page No.-8)

16. **(4)**

By the law of homogeneity

$LT^{-2} = cT^2 + \frac{b}{T^2+d}$

$[c][T^2] = [LT^{-2}]$

$[c] = [LT^{-4}]$

$[t^2] = [d]$

$[d] = T^2$

$\left[\frac{b}{T^2+d}\right] = [LT^{-2}]$

$\left[\frac{b}{T^2}\right] = [LT^{-2}]$

$[b] = [L]$

(New NCERT; 11th; Page No.-8)

17. **(4)**

$P = At$ + B

$MLT^{-1} = AT + B$

From the law of homogeneity

$MLT^{-1} = AT$

$MLT^{-2} = A$

A has a dimension of force

(New NCERT; 11th; Page No.-8)

18. **(3)**

$\frac{\Delta A}{A} \times 100\%$

$= \pm\left[4\frac{\Delta P}{P} + 2\frac{\Delta q}{q} + \frac{\Delta r}{r} + 2\frac{\Delta s}{s} + \frac{\Delta t}{t}\right] \times 100\ \%$

$= \pm[4 \times 2\% + 2 \times 3\% + 4\% + 2 \times 5\% + 6\%]$

$= \pm[8\% + 6\% + 4\% + 10\% + 6\%]$

$= \pm[34\%]$

(New NCERT; 11th; Page No.-6)

19. **(1)**

Total mass of the copper powder (x)
$= (15.64 \pm .02)\ g$
Mass taken out, $y = (6.23 \pm .01)\ g$
Let mass left be z
$z = x - y$
$= 15.64 - 6.23$
$= 9.41\ g$
Maximum error in z, $dz = dx + dy$
$= .02 + .01 = .03\ g$
Mass left $= 9.41 \pm .03\ g$

(New NCERT; 11th; Page No.-6)

20. **(4)**

As we know, if the number is less than 1, then all non-zero digits are always significant and any zero after first non-zero digit is significant but the zeroes before the non-zero digit are insignificant. The number of significant digits in 0.002935000 is 7.

(New NCERT; 11th; Page No.-3)

21. **(2)**

Least count $= \frac{.5}{100} = .005$ mm
Diameter $d = 3.5 + (9 \times .005)$
$= 3.545$ mm
Surface Area $= \pi d\ell$
$= \frac{\pi \times 3.545}{10} \times 7.9$
$= 8.8\ \text{cm}^2$

22. **(1)**

$V = \sqrt{36 - 5x}$
$a = \frac{dV}{dx} \times \frac{dx}{dt} = \frac{-5}{2} \times \frac{1}{\sqrt{36-5x}} \times \sqrt{36 - 5x}$
$\frac{dV}{dt} = a = -2.5\ \text{m/s}^2$

(New NCERT; 11th; Page No.-34)

23. **(4)**

$\frac{S_5}{S_4} = \frac{\frac{1}{2} \times a \times 5^2 - \frac{1}{2} \times a \times 4^2}{\frac{1}{2} \times a \times 4^2 - \frac{1}{2} \times a \times 3^2}$
$= \frac{25-16}{16-9}$
$= \frac{9}{7}$

(New NCERT; 11th; Page No.-17)

24. **(2)**

$a_{AB} = \frac{-30}{20} = -1.5\ \text{m/s}^2$
$a_{BC} = 0\ \text{m/s}^2$
$a_{CD} = \frac{60}{50-30} = \frac{60}{20} = 3\ \text{m/s}^2$
$a_{DE} = \frac{0-30}{60-50} = -3\ \text{m/s}^2$
$a_{EF} = 0\ \text{m/s}^2$
$a_{FG} = \frac{40-0}{90-70} = 2\ \text{m/s}^2$
hence, maximum positive acceleration is in region *CD*.

(New NCERT; 11th; Page No.-15)

25. **(2)**

$x = at^5 + bt^3 + ct + d$
$\frac{dx}{dt} = 5at^4 + 3bt^2 + c$
$a = \frac{d^2x}{dt^2} = 20at^3 + 6bt$
at $t = 2$ s
$a = 20 \times a \times 8 + 6 \times b \times 2$
$= 160\ a + 12b$

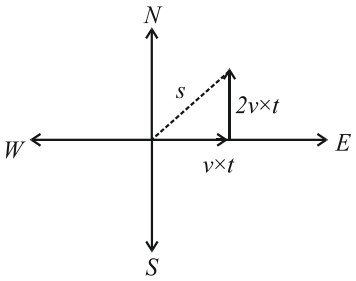
(New NCERT; 11th; Page No.-15)

26. **(4)**

The only option in which acceleration is independent of time 't' is the fourth one as
$v = \frac{dx}{dt} = \sqrt{4x + 8}$
Then $a = \frac{dv}{dx} \cdot \frac{dx}{dt} = \frac{1}{2} \times \frac{1}{\sqrt{4x+8}} \times 4 \times \sqrt{4x + 8}$
$\frac{dv}{dt} = a = 2$ units

(New NCERT; 11th; Page No.-15)

27. **(1)**

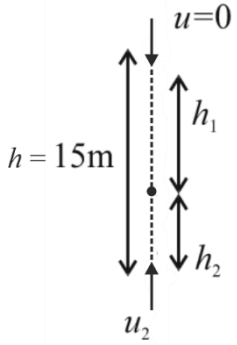


distance $s = \sqrt{(vt)^2 + (2vt)^2}$
$= \sqrt{v^2t^2 + 4v^2t^2} = \sqrt{5}vt$
total time $= 2t$
average velocity $V_{avg} = \frac{\sqrt{5}vt}{2t}$
$= \frac{\sqrt{5}v}{2}\ \text{m/s}^2$

(New NCERT; 11th; Page No.-14)

28. **(3)**

Let the initial velocity of stone which is thrown from the ground be u_2.
At maximum height of 60 meters, velocity $v_2 = 0$



Using $v_2^2 = u_2^2 - 2g \times 60$

Initial velocity $u_2 = \sqrt{120g}$

Let h_1 be the distance covered by the stone, which is dropped from height h, let h_2 be the distance covered by the stone which is thrown up from the ground.

Let at time 't' both stones crosse each other.

Using $s = ut + \frac{1}{2}at^2$

$h_1 = \frac{1}{2}gt^2$

and $h_2 = u_2t - \frac{1}{2}gt^2$

$h_1 + h_2 = 15$ {given in the question}.

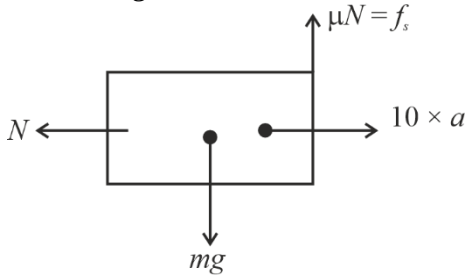
$\frac{1}{2}gt^2 + u_2t - \frac{1}{2}gt^2 = 15$

$t = \frac{15}{\sqrt{120g}} = \frac{15}{\sqrt{1200}} = 0.433\ s$

(New NCERT; 11th; Page No.-17)

29. (1)

F.B.D of 10 kg block



$N = 10 \times a$

For block to not slip;

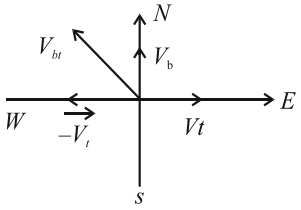
and $f_s \geq mg$

$\mu N \geq mg \Rightarrow \mu\ 10 \times a \geq 10\ g \Rightarrow \mu \geq \frac{g}{a}$.

$a \geq \frac{g}{\mu} \Rightarrow a \geq \frac{g}{0.2} \Rightarrow a \geq 5g$

(New NCERT; 11th; Page No.-60)

30. (2)



$\overrightarrow{V_b} = \overrightarrow{V_t} + \overrightarrow{V_b t}$

31. (3)

As no acceleration is present in x- direction, velocity in x direction will not change.

(New NCERT; 11th; Page No.-38)

32. (3)

The time of flight of a projectile is indeed influenced by its initial velocity and the angle of projection. The time of flight is determined by the vertical motion of the projectile.

So, the correct answer is:

Assertion (A) is true, and **Reason (R)** is false.

(New NCERT; 11th; Page No.-38)

33. (2)

$|\vec{F}| = m \times |\vec{a}|$

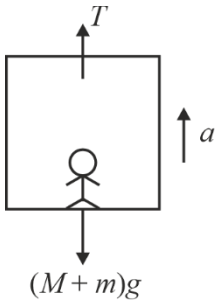
$\sqrt{7^2 + (-5)^2 + 12^2} = m \times 3$

$\sqrt{49 + 25 + 144} = 3m$

$m = \frac{\sqrt{218}}{3}\ kg$

(New NCERT; 11th; Page No.-53)

34. (1)



Mass of lift M =?

'T' tension in the cable = 5500 N

acceleration of lift 'a' = 2m / s

T – (M + m) g = (M + m) a

T = (M + m) (g + a)

5500 = (80 + M) (12)

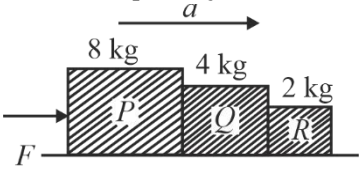
$\frac{5500}{12} - 80$ = M

M = 378.33 kg

(New NCERT; 11th; Page No.-64)

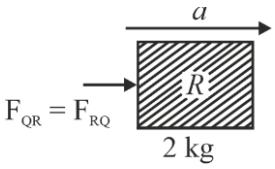
35. (1)

From FBD of complete system.



$18 = (8 + 4 + 2)\ a \Rightarrow \frac{18}{14} = a$

$\rightarrow a = \frac{9}{7}\ m/s^2$



$F_{RQ} = F_{QR} = 2 \times \frac{9}{7} = \frac{18}{7}$

(New NCERT; 11th; Page No.-64)

SECTION-B

36. (3)

Change in the momentum = Area under the F – t curve

$= 5 \times 2 + \frac{1}{2} \times 5 \times (6 - 4) - \frac{1}{2} \times 5 \times (4 - 2)$

10 N-s

(New NCERT; 11th; Page No.-55)

37. (3)

$x = 2 - y - y^2 + 5x$

$-4x = 2 - y - y^2$

$x = \frac{y^2+y-2}{4}$

$\int_{-3}^{4} x dy = \int_{-3}^{4} \frac{y^2+y-2}{4} dy$

$= \frac{1}{4}\left[\frac{y^3}{3} + \frac{y^2}{2} - 2y\right]_{-3}^{4}$

$= \frac{1}{4}\left[\left(\frac{64}{3} + \frac{16}{2} - 8\right) - \left(\frac{-27}{3} + \frac{9}{2} + 6\right)\right]$

$= \frac{1}{4}\left[\frac{64}{3} + \frac{16}{2} - 8 + \frac{27}{3} - \frac{9}{2} - 6\right]$

$= \frac{1}{4}\left[\frac{182+21-84}{6}\right] = \frac{119}{24}$

38. (2)

At maximum height

$\frac{dy}{dt} = 0$

$20\sqrt{3} - 2 \times \frac{1}{2} \times 40\sqrt{5}t = 0$

$t = \frac{20\sqrt{3}}{40\sqrt{5}} = \sqrt{\frac{3}{20}}\, s$

y_{max} at $t = \sqrt{\frac{3}{20}}\, s = 20\sqrt{3} \times \sqrt{\frac{3}{20}} - \frac{1}{2} \times 40 \times \sqrt{5} \times \frac{3}{20}$

$= \frac{20\times3}{\sqrt{20}} - 3\sqrt{5}$

$= 3\sqrt{20} - 3\sqrt{5}$

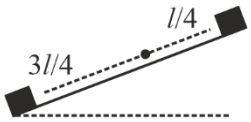
$= 3\sqrt{4\times5} - 3\sqrt{5}$

$= 6\sqrt{5} - 3\sqrt{5}$

$= 3\sqrt{5}$m.

(New NCERT; 11th; Page No.-38)

39. (4)



Up to $\frac{l}{4}$, mg sin θ = m × a

a = g sin θ

Using $v^2 = u^2 + 2as$

$v^2 = 0 + 2g \sin\theta \times \frac{l}{4}$

$v^2 = g\frac{l \sin\theta}{2}$

From portion $\frac{l}{4}$ to l

mg sin θ – μmg cos θ = m a′

g sin θ – μg cos θ = a′

Again using,

$v^2 = u^2 + 2as$

$0 = g\frac{l \sin\theta}{2} + 2(g \sin\theta - \mu g \cos\theta) \times \frac{3l}{4}$

$g\frac{l \sin\theta}{2} = \mu g \frac{3l}{2} \cos\theta - g \times \frac{3l}{2} \sin\theta$

$\frac{\sin\theta}{2} + \frac{3}{2}\sin\theta = \frac{3}{2}\mu \cos\theta$

$\frac{\sin\theta + 3\sin\theta}{2} = \frac{3}{2}\mu \cos\theta$

$4\sin\theta = 3\mu \cos\theta$

$\mu = \frac{4}{3}\tan\theta$

(New NCERT; 11th; Page No.-64)

40. (4)

$\left[(\vec{A}_1 + 3\vec{A}_2).(4\vec{A}_1 - 5\vec{A}_2)\right]$

$\left[4|\vec{A}_1|^2 - 5\vec{A}_1.\vec{A}_2 + 12\vec{A}_2.\vec{A}_1 - 15|\vec{A}_2|^2\right]$

given $|\vec{A}_1 + \vec{A}_2| = 5$, $|\vec{A}_1| = 2$ and $|\vec{A}_2| = 5$

$|\vec{A}_1 + \vec{A}_2|^2 = (\vec{A}_1 + \vec{A}_2).(\vec{A}_1 + \vec{A}_2)$

$25 = |\vec{A}_1|^2 + |\vec{A}_2|^2 + 2\vec{A}_1.\vec{A}_2$

$25 = 4 + 25 + 2\,\vec{A}_1.\vec{A}_2$

$-2 = \vec{A}_1.\vec{A}_2$

$\left[4|\vec{A}_1|^2 - 5\vec{A}_1.\vec{A}_2 + 12\vec{A}_2.\vec{A}_1 - 15|\vec{A}_2|^2\right] =$

$[4 \times 4 - 5 \times (-2) + 12 \times (-2) - 15 \times 25]$

$=[16 + 10 - 24 - 375]$

$= [-373]$

(New NCERT; 11th; Page No.-71)

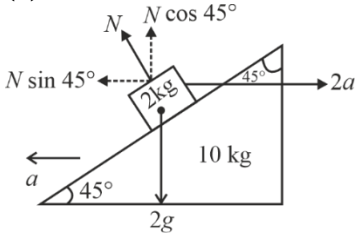
41. (1)

At highest point mg = $\frac{m(U \sin\theta)^2}{R}$

$R = \frac{U^2 \sin^2\theta}{g}$

(New NCERT; 11th; Page No.-38)

42. (3)



$N\cos 45° = 2g$
$N\sin 45° = 2a$
$\Rightarrow \tan 45° = \frac{a}{g}$

$\Rightarrow a = g$

(New NCERT; 11th; Page No.-64)

43. (2)

$\vec{F}_1 + \vec{F}_2 + \vec{F}_3 = m \times \vec{a}$

$2\hat{i} + 3\hat{j} + \hat{i} - \hat{k} + 3\hat{i} - 4\hat{k} = 3\vec{a}$

$6\hat{i} + 3\hat{j} - 5\hat{k} = 3\vec{a}$

$\vec{a} = \frac{6}{3}\hat{i} + \frac{3}{3}\hat{j} - \frac{5}{3}\hat{k} = 2\hat{i} + \hat{j} - \frac{5}{3}\hat{k}$

(New NCERT; 11th; Page No.-53)

44. (3)

Assertion (A) is true because the slope of a velocity-time graph does represent acceleration. In a velocity-time graph, the slope at any point on the graph represents the rate of change of velocity, which is the definition of acceleration.

Reason (R) is false because the area under an acceleration-time graph represents the change in velocity, not the change in displacement.

So, while (A) is true, (R) is not a correct explanation of (A), and option 3 is the appropriate choice.

(New NCERT; 11th; Page No.-15)

45. (1)

$\vec{V} = \vec{\omega} \times \vec{r}$

$$= \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 5 & 6 & -10 \\ 5 & -8 & 7 \end{vmatrix}$$

$= \hat{i}\ (42\text{-}80) + \hat{j}\ (-50-35) + \hat{k}\ (-40-30)$

$= -38\hat{i} - 85\hat{j} - 70\hat{k}$

(New NCERT; 11th; Page No.-101)

46. (2)

Here's an explanation for each statement.

A. Object A will always have a greater velocity than Object B: This statement is not necessarily true. Object A is accelerating, but it doesn't mean it will always have a greater velocity than Object B. Object B can start with a higher velocity and maintain it.

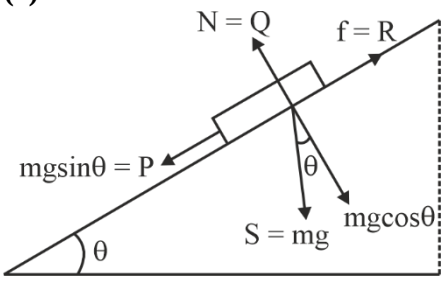
B. Object A can have both a greater velocity and a greater acceleration than Object B at certain points in time: This statement is correct. Object A, due to its acceleration, can reach greater velocities than Object B at certain points in time. Additionally, it can have a greater acceleration, as Object B is moving at a constant velocity (which implies zero acceleration).

C. Object A will always have a greater acceleration than Object B: This statement is true. Object A has an acceleration, as Object B have zero acceleration as it is moving at a constant velocity.

D. None of the above statements are true: This statement is not true because statement (B) and (C) is correct.

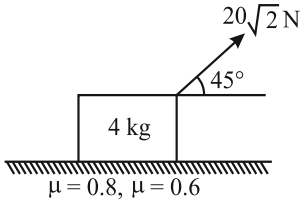
(New NCERT; 11th; Page No.-17)

47. (4)



(New NCERT; 11th; Page No.-59)

48. (1)



$N + 20\sqrt{2}\sin 45^\circ = 40$

$N = 20$ N

Limiting friction = $0.8 \times N = 0.8 \times 20 = 16$

F = Force in x-direction = $20\sqrt{2}\cos 45^\circ = 20 > 16$

$\Rightarrow$ Block will move and kinetic friction will act.

So, force of friction 'f' = $0.6 \times N = 0.6 \times 20 = 12$N

Acceleration = $\frac{F-f}{m} = \frac{20-12}{4} = 2$ m/s^2

(New NCERT; 11th; Page No.-60)

49. (2)

$F - (8 + 12)\,g = (8 + 12)a$

$600 - 200 = 20\,a$

$400 = 20a$

$a = 20$ m/s^2

$T_2 - 12g = 12a$

$T_2 = 120 + (12 \times 20)$

$= 120 + 240$

$= 360\ N$

$F = T_1 = 600\ N$

(New NCERT; 11th; Page No.-64)

50. (3)

$T_1 = T_2 = T$.

$10\,g - T = 10 \times a$ ……(i)

$T = 8 \times a$ ……(ii)

$10g = 18a \rightarrow$ from (i), (ii)

$a = \frac{50}{9}$ m/s^2

from (i) $100 - T = \frac{10 \times 50}{9}$

$T = 100 - \frac{500}{9} = \frac{400}{9}$ N

(New NCERT; 11th; Page No.-64)

SECTION-A

51. (2)

The reaction is depicted as:

$SO_2 + \frac{1}{2}O_2 \leftrightarrow SO_3$

We have initially:

$SO_2 = 4$ mol

$O_2 = 6$ mol

$SO_3 = 0$ mol

At equilibrium:

$SO_2 = 4 - 4(0.7) = 1.2$ mol

$O_2 = 6 - 4(0.35) = 4.6$ mol

$SO_3 = 4(0.7) = 2.8$ mol

Therefore, total moles of SO_2, O_2 and SO_3 at equilibrium $= 8.6$ mol

(NEW NCERT CLASS 11th Pg No. 18)

52. (3)

Moles of C = 24/12 = 2

Moles of H = 4/1 = 4

Moles of O = 64/16 = 4

Empirical formula = CH_2O_2

(NEW NCERT CLASS 11th Pg No. 16)

53. (3)

Ratio of atoms $= C: H: O = \frac{6}{12}:\frac{1}{1}:\frac{4}{16} = 2:4:1$

Therefore, empirical formula = C_2H_4O

Since, Molecular mass $= 88$

Molecular Formula = $C_4H_8O_2$

(NEW NCERT CLASS 11th Pg No. 16)

54. (3)

1 mole of N_2 occupy 22.4 L

So, 0.25 mole of N_2 occupy 5.6 L

(NEW NCERT CLASS 11th Pg No. 17)

55. (3)

Let the fraction of M^{3+} be x.

Then fraction of M^{2+} will be $(0.96 - x)$.

Now for the compound to be neutral,

$3x + 2(0.96 - x) = 2$

$3x + 1.92 - 2x = 2$

$x = 2 - 1.92$

$x = 0.08$

So, fraction of M^{3+} will be 8%.

(NEW NCERT CLASS 11th Pg No. 15)

56. (3)

1 mole of $K_3[Fe(CN)_6]$ = 6 mole C.

0.8 mole of $K_3[Fe(CN)_6]$ = 6 × 0.8 × 12 g C

= 57.6 g

(NEW NCERT CLASS 11th Pg No. 15)

57. (4)

1 mole of H_2O contains 8 mole of neutrons = 8 N_A neutrons

1.8 g of H_2O contains = $\frac{8\times1.8}{18}$ N_A neutrons

= 0.8 N_A neutrons

(NEW NCERT CLASS 11th Pg No. 15)

58. (1)

$M_1 V_1 = M_2 V_2$

$272 \times 0.24 = M_2 \times 450$

65 = M_2 × 450 (0.24 has 2 significant figures)

M_2 = 0.14 (Since, 65 has 2 significant figures)

(NEW NCERT CLASS 11th Pg No. 09)

59. (4)

The data illustrates that,

For N_2O_5, percentage of N 25.92%

The remaining percentage will be of oxygen = 74.08%

Similar for the case of NO_2

Now, according to the law of multiple proportion:

If two element combined to form more than one element which combine with a fixed mass of other elements beer a simple ratio to one another.

(NEW NCERT CLASS 11th Pg No. 12)

60. (3)

(1) 1 mole of N_2 = N_A molecules
2 mole of N_2 = $2N_A$ molecules

(2) 28g of N_2 = N_A molecules
41g of N_2 = 1.46 N_A molecules

(3) $6.022 \times 10^{24} = 10N_A$

(4) 1g atom of N_2 = N_A molecules
5g atom of N_2 = 5 N_A molecules

(NEW NCERT CLASS 11th Pg No. 14)

61. (1)

Mass of HCl = a

Moles of HCl = a/36.5

Now, mass of solution = 100g

Volume of solution = 100/b

$$\text{Molarity} = \frac{\text{moles}_{\text{Solute}} \times 1000}{\text{volume}_{\text{Solution}}(\text{mL})} = \frac{ab}{3.65}$$

(NEW NCERT CLASS 11th Pg No. 20)

62. (2)

$$\text{Molarity} = \frac{\text{moles}_{\text{Solute}} \times 1000}{\text{volume}_{\text{Solution}}(\text{mL})} = \frac{5.5\times1000}{36.5\times250} = 0.6$$

(NEW NCERT CLASS 11th Pg No. 20)

63. (1)

Molarity is depend on volume of solution and volume is a function of temperature.

(NEW NCERT CLASS 11th Pg No. 20)

64. (2)

$$\frac{r_3}{r_2} = \frac{0.529 \times \frac{3^2}{2}}{0.529 \times \frac{2^2}{4}} = \frac{9}{2}$$

(NEW NCERT CLASS 11th Pg No. 48)

65. (4)

$$r = 0.529 \frac{n^2}{Z} \text{ (Å)}$$

(NEW NCERT CLASS 11th Pg No. 48)

66. (2)

As, $(KE)_1 = 3 \times (KE)_2$

$\therefore\ h\nu_1 - h\nu_0 = 3(h\nu_2 - h\nu_0)$

Or, $2h\nu_0 = 3h\nu_2 - h\nu_1$

Or, $\nu_0 = \nu_o = \frac{3\nu_2 - \nu_1}{2}$

$$\nu_o = \frac{3 \times (2 \times 10^{16}) - (3.2 \times 10^{16})}{2} = 1.4 \times 10^{16} \text{ Hz}$$

(NEW NCERT CLASS 11th Pg No. 42)

67. (2)

Refer theory

(NEW NCERT CLASS 11th Pg No. 54)

68. (2)

$$\lambda = \frac{h}{mv} = \frac{6.626 \times 10^{-34}}{5 \times 10^{-6} \times 25}$$
$$= 5.3 \times 10^{-30} \text{ m.}$$

(NEW NCERT CLASS 11th Pg No. 50)

69. (1)

Energy depends on $(n + l)$

$1 \rightarrow (n + l) = 6$
$2 \rightarrow (n + l) = 5$
$3 \rightarrow (n + l) = 5$
$4 \rightarrow (n + l) = 5$

$\therefore$ Max energy for 1

(NEW NCERT CLASS 11th Pg No. 55)

70. (4)

Refer theory

(NEW NCERT CLASS 11th Pg No. 61)

71. (2)

Refer theory

(NEW NCERT CLASS 11th Pg No. 57)

72. (1)

Electronic configuration of Cr(II) = $[Ar]3d^4 4s^0$

Unpaired electrons = 4

Electronic configuration of Cr(II) = $[Ar]3d^8 4s^0$

Unpaired electrons = 2(due to pairing of electrons)

Ratio = 2 : 1

(NEW NCERT CLASS 11th Pg No. 61)

73. (1)

$$\text{mass} = 20 \text{ g}, \Delta x = 3 \times 10^{-4} \text{ m}$$
$$\Delta x \cdot m \cdot \Delta v = \frac{h}{4\pi}$$
$$\Delta v = \frac{h}{\Delta x \cdot m \cdot 4\pi}$$
$$\Delta v = 8.75 \times 10^{-30} \text{ m/s}$$

(NEW NCERT CLASS 11th Pg No. 51)

74. (3)

$$\frac{1}{\lambda} = R\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$$

Here $n_1 = 2, n_2 = \infty$

$R = 1.097 \times 10^7 \text{ m}^{-1}$

$$\frac{1}{\lambda} = 1.097 \times 10^7 \left[\frac{1}{2^2} - \frac{1}{\infty^2}\right] = 0.274 \times 10^7 \text{ m}^{-1}$$
$\therefore \lambda = 364 \text{ nm}$

(NEW NCERT CLASS 11th Pg No. 45)

75. (2)

Unpaired electron of F is in $2p^5$ electronic configuration state. so n = 2, l = 1 and m = 1

(NEW NCERT CLASS 11th Pg No. 55)

76. (2)

(1) Oxidation state of N in N_2O_5 = +5
(2) Oxidation state of N in NH_4OH = –3
(3) Oxidation state of N in HN_3 = –1/3
(4) Oxidation state of N in N_2H_4 = –2

(NEW NCERT CLASS 11th Pg No. 239)

77. (3)

Oxidation state of Cl changes from +5 to –1.

(NEW NCERT CLASS 11th Pg No. 239)

78. (3)

Balanced equation is:

$$Cr_2o_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{+3} + 7H_2O$$

(NEW NCERT CLASS 11th Pg No. 246)

79. (3)

Balanced equation is:

$$MnO_4^- + 2H_2O + 2e^- \rightarrow MnO_2 + 4OH^-$$

(NEW NCERT CLASS 11th Pg No. 246)

80. (1)

Equivalent mass of $FeSO_4$ = 151/1 = 151

(NEW NCERT CLASS 11th Pg No. 23)

81. (2)

A disproportionation reaction is a reaction in which the same element is simultaneously oxidized and reduced.

In reaction (a), Cu^+ is reduced and oxidized into Cu and Cu^{+2} both respectively.

In reaction (b), P_4 is reduced and oxidized into PH_3 and NaH_2PO_2 both respectively.

(NEW NCERT CLASS 11th Pg No. 264)

82. (1)

$$\text{Equivalent weight} = \frac{\text{Molecular weight}}{\text{No. of electrons involved in reaction}}$$

Molecular weight = Equivalent-weight × No. of electrons involved in reaction

$KMnO_4$ in acidic medium,

$MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$

Number of electrons involved = 5

Therefore, Molecular weight = 5 × Equivalent weight

(NEW NCERT CLASS 11th Pg No. 23)

83. (2)

In $KMnO_4$, Mn is in +7 oxidation state, So it can act as an oxidizing agent because +7 is the highest oxidation state.

(NEW NCERT CLASS 11th Pg No. 259)

84. (3)

$MnO_4^- + 1e^- \rightarrow MnO_4^{2-}$

(NEW NCERT CLASS 11th Pg No. 257)

85. (2)

The oxidation number of S in H_2S is -2 which is the lowest oxidation state exhibited by S. So it can act as an reducing agent only.

(NEW NCERT CLASS 11th Pg No. 261)

SECTION-B

86. (3)

In one day, a person produces 2.7 L of gastric juices which contain $2.7 \times 2.8 = 7.56$ g of HCl. This corresponds to $\frac{7.56}{36.5} = 0.21$ moles of HCl.

1 mole of $Al(OH)_3$ will neutralize 3 moles of HCl.

Hence, 0.21 moles of HCl will be neutralized by $\frac{0.21}{3} = 0.07$ moles of $Al(OH)_3$. This corresponds to $0.07 \times 78 = 5.46$ g of $Al(OH)_3$

Each antacid tablet contains 350mg, hence, the number of antacid tablet required per day to neutralize HCl are $\frac{5{\cdot}46}{0.35} \approx 15.6$

(NEW NCERT CLASS 11th Pg No. 17)

87. (4)

$$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$$

$$C_4H_{10} + \frac{13}{2}O_2 \rightarrow 4CO_2 + 5H_2O$$

Let x and y be the volumes of propane and butane, then x + y = 4

3x + 4y = 14

On solving the above equations, we get the value of x and y to be 2 L and 2L

Ratio is 1:1

(NEW NCERT CLASS 11th Pg No. 18)

88. (2)

As we know, minimum 1 atom of Ni must be there in the compound, so for the minimum molar mass, we take the limiting case when the compound has exactly 1 Ni atom.

$\therefore$ 58.7 g of Ni is present in $\frac{100 \times 58.7}{0.39} = 15051$ g = 15 kg

(NEW NCERT CLASS 11th Pg No. 15)

89. (1)

$(Molarity)_A = M = (Molality)_B$

For solution A, M moles of solute is present in 1000 mL solution = 1000g solution (density of H_2O = 1g/mL)

For solution B, M moles of solute is present in 1000 g solvent

So, for more amount of solution B, no. of moles of solute is same as in solution A.

(NEW NCERT CLASS 11th Pg No. 20)

90. (1)

Reaction A: B is the limiting reagent

Reaction B: B is the limiting reagent

Reaction C: B is the limiting reagent

Reaction D: A is the limiting reagent

(NEW NCERT CLASS 11th Pg No. 18)

91. (1)

The ratio of the difference in energy between the first and the second Bohr orbit:

$E_3 - E_2 = 13.6 \times (1)^2 \times \left(\frac{1}{2^2} - \frac{1}{3^2}\right) = 13.6 \times \frac{5}{36}$

The ratio of the difference in energy between the second and the third Bohr orbit:

$E_4 - E_3 = 13.6 \times (1)^2 \times \left(\frac{1}{3^2} - \frac{1}{4^2}\right) = 13.6 \times \frac{7}{144}$

$\frac{E_3 - E_2}{E_4 - E_3} = \frac{13.6 \times \frac{5}{36}}{13.6 \times \frac{7}{144}} = \frac{20}{7}$

(NEW NCERT CLASS 11th Pg No. 48)

92. (3)

$E_4 - E_2 = 10.2 = E_2 - E_1$

$Z_1^2\left[\frac{1}{16} - \frac{1}{4}\right] = Z_2^2\left[\frac{1}{4} - \frac{1}{1}\right]$

$4\left[\frac{3}{16}\right] = Z_2^2\left[\frac{3}{4}\right]$

$Z_2 = 1, \text{i.e. H}$

(NEW NCERT CLASS 11th Pg No. 49)

93. (2)

$\lambda = \frac{h}{p} = \frac{h}{\sqrt{2mK}}$

$\lambda \ \alpha \frac{1}{\sqrt{V}}$

When V becomes four times λ decreases by two times.

(NEW NCERT CLASS 11th Pg No. 50)

94. (3)

Let the atomic number (Z) = number of potons (p) be ' x '

Given: 2 units of positive charge

thus, number of electrons = x – 2

Number of neutrons, $n = 25\%$ more neutrons than electrons

$n = (x - 2) + \frac{25}{100} \times (x - 2)$

$65 - x = \left(\frac{25}{100} + 1\right) \times (x - 2)$

$x = 30$

Therefore, symbol of the $^{65}_{30}Zn^{2+}$

(NEW NCERT CLASS 11th Pg No. 35)

95. (4)

Total number of radial nodes = n – l – 1 = 1

(NEW NCERT CLASS 11th Pg No. 59)

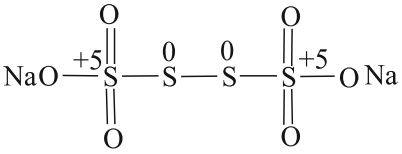
96. (2)

Balanced equation is:

$MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O.$

(NEW NCERT CLASS 11th Pg No. 246)

97. (3)



(NEW NCERT CLASS 11th Pg No. 259)

98. (2)

$3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$

n = 8/3

So, Equivalent weight of Fe $= \frac{56 \times 3}{8} = 21$

(NEW NCERT CLASS 11th Pg No. 23)

99. (2)

Number of equivalents = moles × nf

$n(Sn^{+4}) = 0.25$

$nf(Sn^{+4}) = 2$

Equating number of equivalents of $KMnO_4$ and Sn^{+4}

$n_1nf_1 = n_2nf_2$

$0.25 \times 2 = 5n_2$

$n_{21} = 0.1$

Equating number of equivalents $K_2Cr_2O_7$ and Sn^{+4}

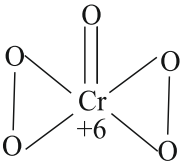
$n_1f_1 = n_2nf_2$

$0.25 \times 2 = 6n_{22}$

$n_{22} = 0.08$

(NEW NCERT CLASS 11th Pg No. 23)

100. (3)



(NEW NCERT CLASS 11th Pg No. 259)

BOTANY

SECTION-A

101. (4)

A-diploid; B-haploid

11th NCERT Pg No. - 125

102. (2)

Gas vacuoles are present in photosynthetic bacteria.

11th NCERT Pg No. - 91

103. (2)

Common Name	Biological Name	Genus	Family	Order	Class	Phylum/ Division
Man	*Homo sapiens*	*Homo*	Hominidae	Primata	Mammalia	Chordata
Housefly	*Musca domestica*	*Musca*	Muscidae	Diptera	Insecta	Arthropoda
Mango	*Mangifera indica*	*Mangifera*	Anacardiaceae	Sapindales	Dicotyledonae	Angiospermae
Wheat	*Triticum aestivum*	*Triticum*	Poaceae	Poales	Monocotyledonae	Angiospermae

11th NCERT Pg No. – 08

104. (1)

Viroids do not have capsid and they have low molecular weight.

11th NCERT Pg No. - 21

105. (2)

G_1 phase corresponds to the interval between mitosis and initiation of DNA replication. During G_1 phase the cell is metabolically active and continuously grows but does not replicate its DNA.

11th NCERT Pg No. - 121

106. (2)

A satellite chromosome is one that has a chromosome segment that is separated from the main body of the chromosome by a secondary constriction

11th NCERT Pg No. - 102

107. (4)

Asexual reproduction is by spores called conidia or sporangiospores or zoospores. Fusion of protoplasm between two motile or non-motile gametes called plasmogamy fusion of two nuclei called karyogamy.

11th NCERT Pg No. –17

108. (3)

Morphology of chromosomes is easily studied at metaphase.

11th NCERT Pg No. - 123

109. (2)

Quasi-fluid nature of lipids enables lateral movement of proteins within the overall bilayer.

11th NCERT Pg No. - 94

110. (1)

The interphase lasts for about 95% of the duration of cell cycle. In yeast, the cell cycle progresses in only about 90 minutes. Therefore, interphase in it lasts for $= \frac{95}{100} \times 90 = >85$ minutes. Thu, the period of actual mitosis will last for about 4 to 5 minutes.

11th NCERT Pg No. – 121

111. (4)

Generic name starts with a capital letter.

11th NCERT Pg No. - 04

112. (4)

Reproduction cannot be an all-inclusive defining characteristic of living organism.

11th OLD NCERT Pg No. - 04

113. (1)

Recombination completes at the end of pachytene.

11th NCERT Pg No. - 126

114. (2)

During anaphase, the sister chromatids are separated simultaneously at their centromeres (primary constriction). The separated chromosomes are then pulled by the spindle to opposite poles of the cell which attaches to the kinetochores (situated around the centromere).

11th NCERT Pg No. –101

115. (1)

Both statements are correct.

11th OLD NCERT Pg No. - 5

116. (1)

All the given structures are made up of microtubules except vacuoles.

11th NCERT Pg No. – 96

117. (4)

Lichens are pollution indicators as they do not grow in polluted areas.

11th NCERT Pg No. - 21

118. (2)

Microtubules are attached to kinetochores.

11th NCERT Pg No. - 127

119. (1)

Cell division occurs in M phase and not in Interphase. Amount of DNA doubles in S phase but the number of chromosomes remain same. Cell is metabolically active in G_0 phase.

11th NCERT Pg No. – 121, 122

120. (2)

Family – Muscidae
Phylum – Arthropoda
Order – Diptera
Species – *domestica*
Genus – *Musca*

11th NCERT Pg No. – 08

121. (1)

The endomembrane system includes ER, golgi complex, lysosomes and vacuoles; since their functions are co-ordinated. Rough endoplasmic reticulum (RER), the ER bearing ribosomes on their surface, is actively involved in protein synthesis, secretion and transport of substances. Smooth endoplasmic reticulum (SER), the ER devoid of ribosome, is the major site for synthesis of lipid. In animal cells lipid-like steroidal hormones are synthesized in SER.

Ribosomes are the site of protein synthesis.

11th NCERT Pg No. - 102

122. (3)

To increase the capacity of the mitochondrion to synthesize ATP, the inner membrane is folded to form cristae. These folds allow a much greater amount of electron transport chain enzymes and ATP synthase to be packed into the mitochondrion.

11th NCERT Pg No. - 97

123. (2)

Chiasmata is observed during diplotene stage.

11th NCERT Pg No. – 126

124. (3)

Higher the category, less is the similarity. Hence there is more difficulty in determining the relationship to the other taxa at that level.

11th NCERT Pg No. – 08

125. (4)

There is DNA replication in Interphase but not in Interkinesis.

11th NCERT Pg No. - 127

126. (2)

Brain-dead human patients do not have self-consciousness.

Each rank or taxon represents a unit of classification.

11th NCERT Pg No. – 04, 05, 08

127. (2)

Archaebacteria differ from other bacteria in having a different cell wall structure.

11th NCERT Pg No. - 13

128. (3)

Schwann proposed the hypothesis that the bodies of animals and plants are composed of cells and products of cells. He also concluded, based on his studies on plant tissues, that the presence of cell wall is a unique character of the plant cells. Rudolf Virchow stated that cells divide and new cells are formed from pre-existing cells. Matthias Schleiden, a German botanist, examined a large number of plants and observed that all plants are composed of different kinds of cells which form the tissues of the plant.

11th NCERT Pg No. - 88

129. (2)

In unicellular organisms, growth is synonymous to reproduction.

11th OLD NCERT Pg No. - 04

130. (2)

ICZN stands for International Code of Zoological Nomenclature.

11th NCERT Pg No. - 04

131. (1)

Dog family is known as Canidae.

11th NCERT Pg No. - 07

132. (1)

Plasmodium – Slime moulds
Mixotrophic nutrition – Euglenoids
Red tide – Dinoflagellates
Oceanic chief producers – Diatoms

11th NCERT Pg No. – 15, 16

133. (1)

Both statements are correct.

11th NCERT Pg No. - 15

134. (2)

Rhizopus – Phycomycetes
Mucor – Phycomycetes
Agaricus – Edible fungi (basidiomycetes)

11th NCERT Pg No. – 17, 18

135. (1)

Both the given statements are true.

11th NCERT Pg No. – 94

SECTION-B

136. (3)

Common Name	Biological Name	Genus	Family	Order	Class	Phylum/ Division
Man	*Homo sapiens*	*Homo*	Hominidae	Primata	Mammalia	Chordata
Housefly	*Musca domestica*	*Musca*	Muscidae	Diptera	Insecta	Arthropoda
Mango	*Mangifera indica*	*Mangifera*	Anacardiaceae	Sapindales	Dicotyledonae	Angiospermae
Wheat	*Triticum aestivum*	*Triticum*	Poaceae	Poales	Monocotyledonae	Angiospermae

11th NCERT Pg No. – 08

137. (4)

In some prokaryotes like cyanobacteria, there are other membranous extensions into the cytoplasm called chromatophores which contain pigments.

11th NCERT Pg No. - 91

138. (2)

Synapsis occurs in Zygotene stage of Prophase 1. Recombinase works during crossing over in pachytene stage and synthesis of RNA and protein takes place in G_2 phase. Chromatids move to opposite poles (without separation of centromere) in Anaphase I.

11th NCERT Pg No. – 126, 127, 129

139. (1)

Cisternae are present in a golgi complex, the golgi cisternae are concentrically arranged near the nucleus with distinct convex *cis* or the forming face and concave *trans* or the maturing face.

11th NCERT Pg No. – 96

140. (4)

Eukaryotic ribosomes are 80S while prokaryotic ribosomes are 70S.

11th NCERT Pg No. –98

141. (2)

Protista include Chrysophytes, Dinoflagellates, Euglenoids, Slime moulds and Protozoans.

11th NCERT Pg No. - 14

142. (3)

Kingdom plantae does not include fungi.

11th NCERT Pg No. -19

143. (2)

Both assertion and reason are true but reason is not correct explanation of assertion.

11th NCERT Pg No. - 128

144. (1)

All given statements are true.

11th NCERT Pg No. – 93, 94

145. (4)

Condensation of chromosome is completed during metaphase and a very significant contribution of mitosis is cell repair.

11th NCERT Pg No. – 123, 125, 126, 127

146. (2)

Walls of diatoms are indestructible as they are made up of silica.

11th NCERT Pg No. - 14

147. (2)

Bovine Spongiform encephalopathy (BSE) commonly called as mad cow disease is caused by prions which are abnormally folded proteins.

11th NCERT Pg No. - 21

148. (1)

Order Carnivora and Primata come under Class Mammalia.

11th NCERT Pg No. - 07

149. (2)

Puccinia – wheat rust pathogen
Neurospora – used in biochemical & genetic work
Saprophytes – feed on dead substrates
Albugo – parasitic fungus on mustard

11th NCERT Pg No. – 17, 18

150. (1)

Both statements are correct.

11th NCERT Pg No. – 125

ZOOLOGY

SECTION-A

151. (2)

Adipose tissue is a type of loose connective tissue located mainly beneath the skin. The cells of this tissue are specialised to store fats.

(Old NCERT; 11th; Page No.-103)

152. (1)

Relaxation of the diaphragm and the inter-costal muscles returns the diaphragm and sternum to their normal positions and reduce the thoracic volume and thereby the pulmonary volume. This leads to an increase in intra-pulmonary pressure to slightly above the atmospheric pressure causing the expulsion of air from the lungs, i.e., expiration.

(New NCERT; 11th; Page No.- 186)

153. (2)

Clot or coagulam formed mainly of a network of threads called fibrins in which dead and damaged formed elements of blood are trapped.

(New NCERT; 11th; Page No.-196)

154. (3)

Given picture is of areolar tissue in which X represents collagen fibres and Y represent mast cells.

(Old NCERT; 11th; Page No.-103)

155. (3)

List-I	List-II
Transport of CO_2	Carbonic anhydrase
Transport of O_2	Haemoglobin
Contraction of diaphragm	Expiration
Regulation of respiration	Pneumotaxic centre

(New NCERT; 11th; Page No.-185, 189, 190)

156. (4)

Asbestosis is an occupational respiratory disorder which occurs mainly to the workers who works in cement griding or stone crushing industries. It can be prevented by using a protective mask while working.

(New NCERT; 11th; Page No.-191)

157. (3)

Skeletal muscle fibres are bundled together in a parallel fashion enclosed by a sheath of tough connective tissue. These fibres are composed of numerous fine fibrils, called myofibrils.

(Old NCERT; 11th; Page No.-104)

158. (1)

In *erythroblastosis foetalis*, Rh-ve mother produces antibodies against Rh antigen in her blood. In case of her subsequent pregnancies, these antibodies can leak into the blood of Rh+ve foets and destroy the RBCs.

(New NCERT; 11th; Page No.-196)

159. (1)

Neural tissue exerts the greatest control over the body's responsiveness to changing conditions.

(Old NCERT; 11th; Page No.-105)

160. (2)

Oxygen dissociation curve is highly useful in studying the effect of factors like pCO_2, H^+ concentration, etc., on binding of O_2 with haemoglobin.

(New NCERT; 11th; Page No.-189)

161. (2)

A healthy adult man has, on an average, 5 millions to 5.5 millions of RBCs mm^{-3} of blood. WBCs are lesser in number i.e., around 6000-8000 mm^{-3} of blood. RBCs are destroyed in spleen.

(New NCERT; 11th; Page No.-194)

162. (2)

Cuboidal type of simple epithelium is represented by (b) in the given diagram.

(Old NCERT; 11th; Page No.-101)

163. (3)

CO_2 is carried by haemoglobin as carbamino-haemoglobin. CO_2 trapped as bicarbonate at the tissue level and transported to the alveoli is released out as CO_2.

(New NCERT; 11th; Page No.-189, 190)

164. (2)

Both antigens A and B are present on the RBCs of a person with AB blood group.

(New NCERT; 11th; Page No.-195)

165. (4)

Blood (fluid connective tissue), bones and cartilage are the examples of specialized connective tissue.

(Old NCERT; 11th; Page No.- 105)

166. (2)

Rhythm of respiratory system is controlled by medulla of our body. A specialised centre present in the medulla region of the brain called respiratory rhythm centre is primarily responsible for this regulation.

(New NCERT; 11th; Page No.-190)

167. (3)

List-I	List-II
Mosquito	Open circulatory system
Earthworm	Closed circulatory system
Fishes	2-chambered heart
Crocodile	4-chambered heart

(New NCERT; 11th; Page No.-197)

168. (3)

Adhering junctions perform cementing to keep neighbouring cells together. Gap junctions facilitate the cells to communicate with each other by connecting the cytoplasm of adjoining cells, for rapid transfer of ions, small molecules and sometimes big molecules.

(Old NCERT; 11th; Page No.-102)

169. (2)

Y-axis of oxygen dissociation curve represents percentage saturation of hemoglobin with oxygen.

(New NCERT; 11th; Page No.-189)

170. (3)

Heart, the mesodermally derived organ, is situated in the thoracic cavity, in between the two lungs, slightly tilted to the left. It has the size of a clenched fist. It is protected by a double walled membranous bag, pericardium, enclosing the pericardial fluid.

(New NCERT; 11th; Page No.-198)

171. (3)

All cells in epithelium are held together with little intercellular material. In nearly all animal tissues, specialised junctions provide both structural and functional links between its individual cells.

(Old NCERT; 11th; Page No.-102)

172. (2)

Residual Volume (RV) is the volume of air remaining in the lungs even after a forcible expiration. This averages 1100 mL to 1200 mL.

(New NCERT; 11th; Page No.-187)

173. (1)

In the muscles of arm striated skeletal muscles are present.

(Old NCERT; 11th; Page No.-104)

174. (2)

During each cardiac cycle two prominent sounds are produced which can be easily heard through a stethoscope. The first heart sound (lub) is associated with the closure of the tricuspid and bicuspid valves whereas the second heart sound (dub) is associated with the closure of the semilunar valves.

(New NCERT; 11th; Page No.-200)

175. (4)

Tendon is a dense regular connective tissue which attaches skeletal muscle to the bones.

(New NCERT; 11th; Page No.- 103)

176. (4)

A	B	C
Endothelium of blood capillary	Basement membrane	Squamous epithelium of alveolar wall

(New NCERT; 11th; Page No.-188)

177. (3)

The columnar epithelium is composed of a single layer of tall and slender cells. Their nuclei are located at the base. Free surface may have microvilli. They are found in the lining of stomach and intestine and help in secretion and absorption. If the columnar or cuboidal cells bear cilia on their free surface they are called ciliated epithelium. Their function is to move particles or mucus in a specific direction over the epithelium. They are mainly present in the inner surface of hollow organs like bronchioles and fallopian tubes.

(Old NCERT; 11th; Page No.-101)

178. (1)

Angina or 'angina pectoris' is referred to as acute chest pain. It appears when no enough oxygen is reaching the heart muscle.

(New NCERT; 11th; Page No.-203)

179. (2)

Conceptual based question.

(New NCERT; 11th; Page No.-189)

180. (2)

Simple epithelium is composed of a single layer of cells and functions as a lining for body cavities, ducts, and tubes.

(Old NCERT; Class11th; Page No.-101]

181. (2)

Amphibians like frogs can respire through their moist skin (cutaneous respiration) also.

(New NCERT; 11th; Page No.-183)

182. (2)

(A) Breathing or pulmonary ventilation by which atmospheric air is drawn in and CO_2 rich alveolar air is released out.

(B) Diffusion of gases (O_2 and CO_2) across alveolar membrane.

(C) Transport of gases by the blood.

(D) Diffusion of O_2 and CO_2 between blood and tissues.

(E) Utilisation of O_2 by the cells for catabolic reactions and resultant release of CO_2

(New NCERT; 11th; Page No.-185)

183. (3)

In the tissues, where low pO_2, high pCO_2, high H^+ concentration (low pH) and higher temperature exist, the conditions are favourable for dissociation of oxygen from the oxyhaemoglobin means affinity of hemoglobin for oxygen decreases.

(New NCERT; 11th; Page No.-189)

184. (3)

The hepatic portal vein carries blood from intestine to the liver before it is delivered to the systemic circulation.

(New NCERT; 11th; Page No.-202)

185. (2)

Functional Residual Capacity (FRC) is the volume of air that will remain in the lungs after a normal expiration. This includes ERV+RV.

(New NCERT; 11th; Page No.-187)

SECTION-B

186. (1)

Conceptual based question.

(Old NCERT; 11th; Page No.-102)

187. (2)

As the solubility of CO_2 is 20-25 times higher than that of O_2, the amount of CO_2 that can diffuse through the diffusion membrane per unit difference in partial pressure is much higher compared to that of O_2.

pO_2 is 40 mmHg in tissue and 95 mmHg in oxygenated blood.

(New NCERT; 11th; Page No.-188)

188. (4)

The P-wave represents the electrical excitation (or depolarisation) of the atria, which leads to the contraction of both the atria. The QRS complex represents the depolarisation of the ventricles, which initiates the ventricular contraction. The contraction starts shortly after Q and marks the beginning of the systole. The T-wave represents the return of the ventricles from excited to normal state (repolarisation).

(New NCERT; 11th; Page No.-201)

189. (3)

The given picture represents dense irregular connective tissue.

(Old NCERT; 11th; Page No.-103)

190. (2)

Receptors associated with aortic arch and carotid artery also can recognize changes in CO_2 and H^+ concentration and send necessary signals to the rhythm centre for remedial actions.

(New NCERT; 11th; Page No.-190)

191. (3)

Basically, each artery and vein consist of three layers: an inner lining of squamous endothelium, the tunica intima, a middle layer of smooth muscle and elastic fibres, the tunica media, and an external layer of fibrous connective tissue with collagen fibres, the tunica externa. The tunica media is comparatively thin in the veins.

(New NCERT; 11th; Page No.-201)

192. (3)

Most of the cartilages in vertebrate embryos are replaced by bones in adults.

(Old NCERT; 11th; Page No.-104)

193. (4)

RBCs contain a very high concentration of the enzyme, carbonic anhydrase and minute quantities of the same is present in the plasma too. This enzyme facilitates the conversion of CO_2 and water into bicarbonates for its transport through the blood.

(New NCERT; 11th; Page No.-190)

194. (1)

List-I	List-II
Deoxygenated blood	Pulmonary artery
Oxygenated blood	Pulmonary vein
Hepatic portal system	Blood to liver from intestine
Coronary circulation	Blood supply to cardiac muscles

(New NCERT; 11th; Page No.-200, 202)

195. (3)

Function od mast cell in connective tissue is to secrete heparin and histamine. They play an important role in allergy and anaphylaxis.

(Old NCERT; 11th; Page No.-103)

196. (2)

Cellular respiration utilisation of O_2 by the cells for catabolic reactions and resultant release of CO_2.

(New NCERT; 11th; Page No.-185)

197. (2)

A- Vein and B- Artery

(New NCERT; 11th; Page No.-202)

198. (3)

X	Y
Ground substance	Collagen fibres

(Old NCERT; 11th; Page No.-104)

199. (4)

The tracheae, primary, secondary and tertiary bronchi, and initial bronchioles are supported by incomplete cartilaginous rings.

(New NCERT; 11th; Page No.-184)

200. (1)

Function of chordae tendineae is to anchor the AV valves to ventricular papillary muscles and keep the AV valves in a closed position during ventricular systole to prevent the backflow of blood into the atria. If chordae tendinae becomes non functional then the blood will flow back to atria and there is reduction in the flow of blood to pulmonary artery.

(New NCERT; 11th; Page No.-198)

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