GSV TEST SERIES

COMBINED OBJECTIVE TEST (COT)

TARGET NEET (UG) - 2027

Test Booklet Code	Test Pattern
04	**NEET (UG)**
ENGLISH	**18-10-2026**

SOLUTION

The next test will be conducted on

01/11/2026 (Sunday)

Complete Syllabus of

COT-01 TO COT-04

FOR REGISTRATION CONTACT

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COMBINED OBJECTIVE TEST (COT)-04

ANSWER KEY

PHYSICS		CHEMISTRY		BIOLOGY			
1	(4)	46	(2)	91	(1)	136	(2)
2	(3)	47	(3)	92	(4)	137	(2)
3	(2)	48	(2)	93	(2)	138	(2)
4	(2)	49	(3)	94	(4)	139	(1)
5	(3)	50	(1)	95	(1)	140	(4)
6	(1)	51	(2)	96	(3)	141	(1)
7	(2)	52	(3)	97	(2)	142	(2)
8	(2)	53	(2)	98	(3)	143	(4)
9	(3)	54	(4)	99	(4)	144	(1)
10	(3)	55	(3)	100	(2)	145	(3)
11	(3)	56	(1)	101	(1)	146	(4)
12	(1)	57	(1)	102	(2)	147	(4)
13	(2)	58	(1)	103	(4)	148	(3)
14	(3)	59	(4)	104	(3)	149	(4)
15	(4)	60	(1)	105	(4)	150	(3)
16	(3)	61	(2)	106	(3)	151	(2)
17	(1)	62	(1)	107	(4)	152	(4)
18	(1)	63	(3)	108	(1)	153	(3)
19	(1)	64	(4)	109	(1)	154	(2)
20	(1)	65	(3)	110	(4)	155	(1)
21	(2)	66	(3)	111	(1)	156	(1)
22	(2)	67	(2)	112	(3)	157	(3)
23	(1)	68	(1)	113	(4)	158	(4)
24	(2)	69	(4)	114	(2)	159	(3)
25	(2)	70	(3)	115	(4)	160	(2)
26	(4)	71	(1)	116	(4)	161	(2)
27	(1)	72	(1)	117	(2)	162	(3)
28	(3)	73	(1)	118	(2)	163	(3)
29	(1)	74	(1)	119	(2)	164	(3)
30	(1)	75	(2)	120	(2)	165	(2)
31	(1)	76	(2)	121	(1)	166	(3)
32	(1)	77	(2)	122	(3)	167	(2)
33	(2)	78	(2)	123	(4)	168	(1)
34	(4)	79	(4)	124	(2)	169	(2)
35	(3)	80	(3)	125	(3)	170	(2)
36	(2)	81	(1)	126	(1)	171	(2)
37	(2)	82	(3)	127	(1)	172	(4)
38	(4)	83	(1)	128	(1)	173	(3)
39	(1)	84	(4)	129	(1)	174	(4)
40	(2)	85	(1)	130	(2)	175	(3)
41	(1)	86	(4)	131	(3)	176	(1)
42	(1)	87	(3)	132	(3)	177	(2)
43	(3)	88	(1)	133	(4)	178	(2)
44	(3)	89	(1)	134	(3)	179	(4)
45	(4)	90	(1)	135	(3)	180	(4)

PHYSICS

1. (4)

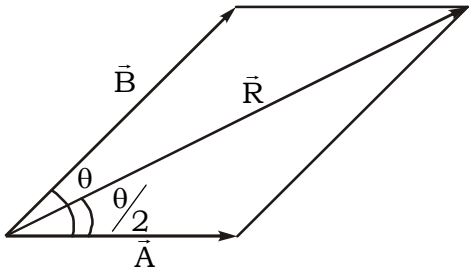
$$\text{L.C.} = \frac{d \bullet x}{n} \qquad d = n-(n-1) = 1$$

$$x = a \text{ cm}$$

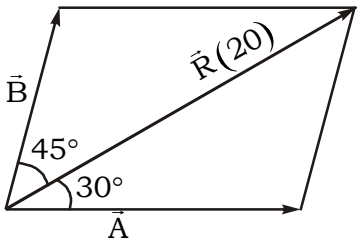
$$\text{L.C.} = \frac{1\times a}{n} = \frac{a}{n}\text{cm} = \frac{10a}{n}\text{mm}$$

2. (3)

Resultant bisects angle b/w $\vec{A}$ & $\vec{B}$



3. (2)



$$A = \frac{R\sin 45°}{\sin(30°+45°)}$$

$$= \frac{20\left(1/\sqrt{2}\right)}{\frac{\sqrt{3}+1}{2\sqrt{2}}} = \frac{20}{\sqrt{2}}\times\frac{2\sqrt{2}}{\sqrt{3}+1} = \frac{40}{\sqrt{3}+1}\times\frac{\sqrt{3}-1}{\sqrt{3}-1}$$

$$= \frac{40\left(\sqrt{3}-1\right)}{3-1} = 20\left(\sqrt{3}-1\right)$$

4. (2)

$$\vec{r} = (4t)\hat{i} + \left(3t^2\right)\hat{j} + 7\hat{k}$$

$$\vec{v} = \frac{d\vec{r}}{dt} = 4\hat{i} + 6t\hat{j}$$

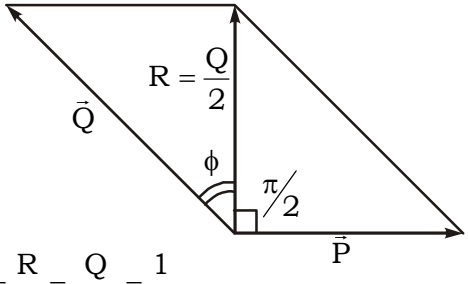
at $t = 1$, $\vec{v} = 4\hat{i} + 6\hat{j}$

$$|\vec{v}| = \sqrt{4^2+6^2} = \sqrt{16+36} = \sqrt{52}$$

With x – axis : $\tan\theta = \frac{6}{4} = \frac{3}{2} = 1.5$

$$\theta = \tan^{-1}(1.5)$$

5. (3)



$$\cos\phi = \frac{R}{Q} = \frac{Q}{2Q} = \frac{1}{2}$$

$$\phi = \frac{\pi}{3}$$

$\therefore$ Angle between

$$\vec{P}\ \&\ \vec{Q} = \frac{\pi}{2} + \frac{\pi}{3} = \frac{3\pi+2\pi}{6}$$

$$= \frac{5\pi}{6}$$

6. (1)

1MSD = x = 1mm

$n = 10, m = 9, d = n - m = 1$

$$\text{L.C.} = \frac{d \bullet x}{n} = \frac{1\times 1}{10} = 0.1\text{mm}$$

L.C. = 0.01cm

Zero Error $= -C_0 \times$ L.C.

$$= -(10-7)\times 0.01 = -0.03\text{cm}$$

$$\text{Observed Reading (O.R.)} = M + (C \times \text{L.C.})$$

$$= 3.1 + (4\times 0.01)$$

$$= 3.14\text{cm}$$

$$\therefore \text{Correct Reading (C.R.)} = \text{O.R.} - \text{Zero Error}$$

$$= 3.14 - (-0.03)$$

$$= 3.17\text{cm}$$

7. (2)

$$\vec{R} = \vec{A} + \vec{B} = 10\hat{i} + 5\hat{j}$$

$$\left|\vec{R}\right| = \sqrt{10^2+5^2} = \sqrt{125} = 5\sqrt{5}$$

$$\tan\theta = \frac{5}{10} = \frac{1}{2}$$

$$\theta = \tan^{-1}\left(\frac{1}{2}\right)$$

8. (2)

According to problem,

$\vec{P}+\vec{Q}=\hat{i}$

$\vec{Q}=\hat{i}-\vec{P}=\hat{i}-\hat{i}+\hat{j}-\hat{k}=\hat{j}-\hat{k}$

9. (3)

10. (3)

11. (3)

$\text{Required vector}=|\vec{P}|\hat{Q}=|\vec{P}|\dfrac{\vec{Q}}{|\vec{Q}|}$

$=\sqrt{25+144}\,\dfrac{8\hat{i}+6\hat{j}}{\sqrt{64+36}}$

$=\dfrac{13}{10}\left(8\hat{i}+6\hat{j}\right)$

$=10.4\hat{i}+7.8\hat{j}$

12. (1)

$\vec{A}\cdot\vec{B}=0$

$2b-5b+2=0$

$-3b+2=0\Rightarrow b=\dfrac{2}{3}$

13. (2)

$\text{L.C.}=\dfrac{P}{n}=\dfrac{1}{100}=0.01\text{mm}$

$\text{Zero Error}=+C_0\times\text{L.C.}=4\times0.01$

$=0.04\text{mm}$

$\text{O.R.}=M+C\times\text{L.C.}$

$=2+(45\times0.01)=2.45\text{mm}$

$\text{Correct Reading}=\text{O.R.}-\text{Zero Error}$

$=2.45-0.04=2.41\text{mm}$

14. (3)

$\vec{u}=6\hat{i},\ \vec{a}=4\hat{i}+6\hat{j}$

$\vec{s}=\vec{u}t+\dfrac{1}{2}\vec{a}t^2=6t\hat{i}+\dfrac{1}{2}\left(4\hat{i}+6\hat{j}\right)t^2$

$\vec{s}=6t\hat{i}+2t^2\hat{i}+3t^2\hat{j}$

$\vec{s}=\underbrace{\left(6t+2t^2\right)}_{x}\hat{i}+\underbrace{3t^2}_{y}\hat{j}$

According to Problem

$3t^2=27\Rightarrow t^2=9\Rightarrow t=3$

at $t=3,\ x=6t+2t^2$

$=(6\times3)+2(3)^2$

$=18+18=36\text{m}$

15. (4)

Here $\vec{u}=6\hat{i}+8\hat{j}$

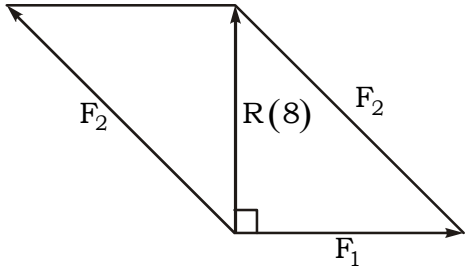
$\vec{a}=\dfrac{\vec{F}}{m}=-\dfrac{8\hat{j}}{4}=-2\hat{j}$

$\vec{v}=\vec{u}+\vec{a}t=6\hat{i}+8\hat{j}-2\hat{j}\times4$

$=6\hat{i}+8\hat{j}-8\hat{j}=6\hat{i}$

16. (2)

$F_1+F_2=16\text{N}.....(1)$



From fig. $F_2^2=R^2+F_1^2$

$(16-F_1)^2=8^2+F_1^2$

$16^2+F_1^2-32F_1=8^2+F_1^2$

$32F_1=16^2-8^2$

$32F_1=(16+8)(16-8)=24\times8$

$F_1=\dfrac{24\times8}{32}=6$

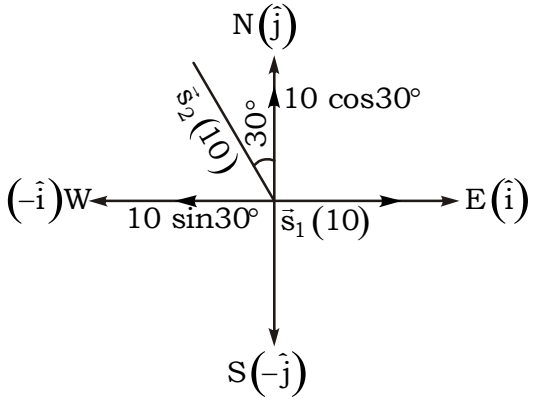
$F_2=16-F_1=16-6=10$

Note: You can also use hit & trail keeping in mind the right angle triangle ratio 3 : 4 : 5

17. (1)

18. (1)

19. (1)



P.T.O.

Rest Part of Q.19

$\vec{s}_1 = 10\hat{i}$

$\vec{s}_2 = 10\sin 30°\left(-\hat{i}\right) + 10\cos 30°\left(\hat{j}\right)$

$\vec{s}_2 = -5\hat{i} + 5\sqrt{3}\hat{j}$

$\vec{s}_3 = ?$

As girl returns to her initial position so

$\vec{s}_{net} = 0 \Rightarrow \vec{s}_1 + \vec{s}_2 + \vec{s}_3 = 0$

$\therefore \vec{s}_3 = -\vec{s}_1 - \vec{s}_2 = -10\hat{i} + 5\hat{i} - 5\sqrt{3}\hat{j}$

$\vec{s}_3 = -5\hat{i} - 5\sqrt{3}\hat{j}$

20. (1)

$$\frac{u^4\sin^2(2\theta)}{g^2H^2} = \left(\frac{u^2\sin 2\theta}{g}\right)^2 \frac{1}{H^2}$$

$$= \frac{R^2}{H^2} = \left(\frac{R}{H}\right)^2 = \left(\frac{2H}{H}\right)^2 = 4$$

21. (2)

22. (2)

$\vec{r} = \vec{r}_f = \vec{r}_i$

$= (0-2)\hat{i} + (0-3)\hat{j} + (0-0)\hat{k}$

$= -2\hat{i} - 3\hat{j}$

$$\vec{\tau} = \vec{r} \times \vec{F} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ -2 & -3 & 0 \\ -F & 0 & 0 \end{vmatrix}$$

$= (0 - 3F)\hat{k} = -3F\hat{k}$

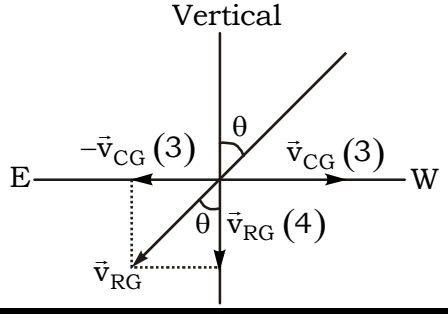
23. (1)

$u = 40, \quad \alpha = 30°$

$\tan\alpha = \frac{gt}{u} \Rightarrow \tan 30° = \frac{10t}{40}$

$\frac{1}{\sqrt{3}}\frac{t}{4} \Rightarrow t = \frac{4}{\sqrt{3}}$

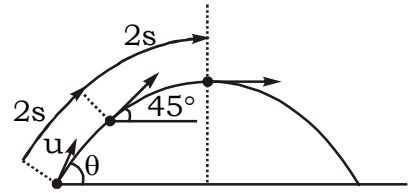
24. (2)



$\vec{v}_{RC} = \vec{v}_{RG} - \vec{v}_{CG}$

$\tan\theta = \frac{3}{4} \Rightarrow \theta = \tan^{-1}\left(\frac{3}{4}\right)$ From vertical towards west

25. (2)



$t_{up} = 4$

$\frac{u\sin\theta}{g} = 4$

$u\sin\theta = 40.....(1)$

$\tan\alpha = \frac{u\sin\theta - gt}{u\cos\theta}$

$\tan 45° = \frac{40 - (10\times 2)}{4\cos\theta} \Rightarrow u\cos\theta = 20....(2)$

$(1)^2 + (2)^2 = u^2\sin^2\theta + u^2\cos^2\theta$

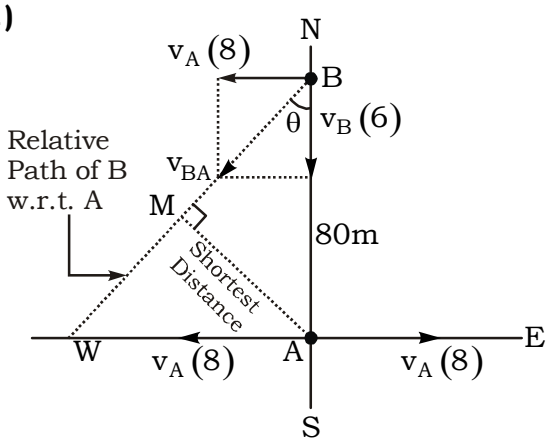
$= (40)^2 + (20)^2$

$u = \sqrt{1600 + 400} = \sqrt{2000}$

$u = \sqrt{400\times 5} = 20\sqrt{5}\,m/s$

26. (4)

27. (1)



$v_{BA} = \sqrt{6^2 + 8^2} = 10$

$\tan\theta = \frac{8}{6} = \frac{4}{3} \Rightarrow \theta = 53°$

$\frac{BM}{80} = \cos 53° = \frac{3}{5}$

$BM = 48m$

$\therefore$ Required time $= \frac{BM}{v_{BA}} = \frac{48}{10} = 4.8\,sec.$

28. (3)

Given $\frac{1}{2}mu^2 = K$ & $\theta = 60°$

$K_H = \frac{1}{2}mu^2\cos^2 60° = K\left(\frac{1}{4}\right)$

29. (1)

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

$\frac{R_A}{R_B} = \frac{(40)^2 \sin 60°}{(60)^2 \sin 120°} = \frac{4}{9} \times \frac{\sqrt{3}/2}{\sqrt{3}/2} = \frac{4}{9}$

30. (1)

$v_{TM} = v_T + v_M = 64 + 8 = 72 km/hr$

$v_{TM} = 72 \times \frac{5}{18} = 20 m/s$

Time taken to cross $t = \frac{s}{v_{TM}} = \frac{150}{20} = 7.5s$

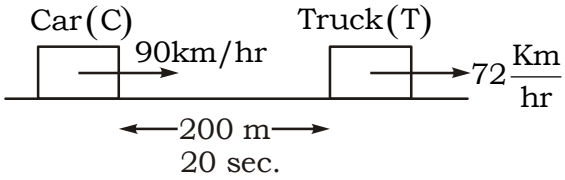
31. (1)

$v = \sqrt{u^2 + 2gh}$

$= \sqrt{5^2 + 2 \times 10 \times 10}$

$= \sqrt{25 + 200} = \sqrt{225} = 15 m/s$

32. (1)



$u_{CT} = 90 - 72 = 18 Km/hr$

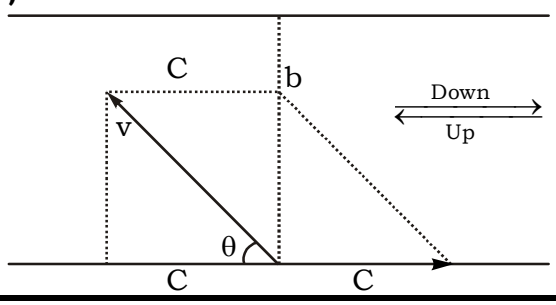
$= 18 \times \frac{5}{18} = 5 m/s$

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

$200 = 5 \times 20 + \frac{1}{2}a(20)^2$

$\frac{1}{2}a(400) = 100 \Rightarrow a = \frac{200}{400} = \frac{1}{2} = 0.5 m/s^2$

33. (2)



$b = 500m$

$C = 5 Km/hr$

$v = 10 Km/hr$

$\cos\theta = \frac{C}{v} = \frac{5}{10} = \frac{1}{2}$

$\theta = 60°$

$t = \frac{b}{v\sin\theta}$

$t = \frac{0.5}{10\sin 60°} hr = \frac{0.5 \times 60}{10 \times \frac{\sqrt{3}}{2}} min$

$= \frac{6}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 2\sqrt{3} min$

34. (4)

$\tan\theta = \frac{4H}{R} = \frac{4H}{H} = 4$

$\theta = \tan^{-1}(4)$

35. (3)

36. (2)

$r_C = \frac{v^3}{ug\cos 60°}$

$$\begin{cases} v = \sqrt{u^2 + (gt)^2 - 2ugt\sin 60°} \\ v = \sqrt{100 + 100 - 2 \times 10 \times 10 \times 1\frac{\sqrt{3}}{2}} \\ v = \sqrt{200 - 100\sqrt{3}} \\ v = 10\sqrt{2 - 1.73} = 10 \times \sqrt{0.27} \\ v = 10\sqrt{\frac{27}{100}} = 3\sqrt{3} \end{cases}$$

$r_C = \frac{3\sqrt{3} \times 3\sqrt{3} \times 3\sqrt{3}}{10 \times 10 \times \frac{1}{2}} = \frac{81\sqrt{3} \times 2}{100}$

$= \frac{162 \times 1.73}{100} < 4 \Rightarrow (2)$

37. (2)

$t_{DS} = \frac{S}{v + C} \Rightarrow 2 = \frac{36}{v + C} \Rightarrow v + C = 18....(1)$

$t_{US} = \frac{S}{v - C} \Rightarrow 3 = \frac{36}{v - C} \Rightarrow v - C = 12....(2)$

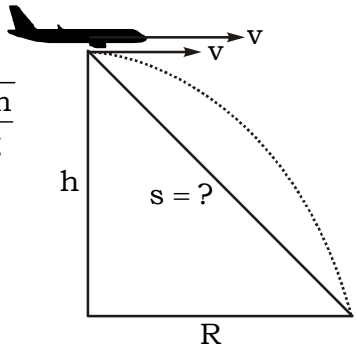
Solving (1) & (2) we get $v = 15\frac{Km}{hr}$

38. (4)

$$\text{By } R = \frac{1}{2}gTT'$$

$$R = \frac{1}{2}gt_1t_2 \Rightarrow t_1t_2 = \frac{2R}{g}$$

39. (1)



$$R = u\sqrt{\frac{2H}{g}} = v\sqrt{\frac{2h}{g}}$$

$$s = \sqrt{R^2 + h^2}$$

$$s = \sqrt{\frac{2hv^2}{g} + h^2}$$

40. (2)

Time taken to meet each other

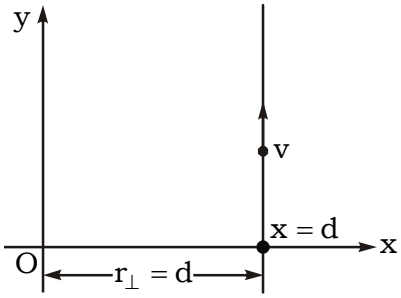
$$t = \frac{d}{2v\left(\sin\frac{\pi}{n}\right)^2} = \frac{d}{2v\left(\sin\frac{\pi}{3}\right)^2}$$

$$t = \frac{d}{2v\left(\frac{3}{4}\right)} = \frac{2d}{3v}$$

$\therefore$ Required distance = speed $\times$ time

$$= v \times \frac{2d}{3v} = \frac{2d}{3}$$

41. (1)



$$\vec{L} = (mvr_\perp)\hat{k}$$

$$\vec{L} = mvd\hat{k}$$

42. (1)

$$y = \sqrt{3}x - 5x^2 \ldots.(1)$$

$$y = (\tan\theta)x - \left(\frac{g}{2u^2\cos^2\theta}\right)x^2 \ldots.(2)$$

$$\text{By}(1)\,\&\,(2),\ \tan\theta = \sqrt{3} \Rightarrow \theta = 60^\circ$$

$$\frac{g}{2v_0^2\cos^2 60} = 5$$

$$\frac{10}{2v_0^2 \times \frac{1}{4}} = 5 \Rightarrow v_0^2 = \frac{20}{5} = 4$$

$$v_0 = 2\text{m/s}$$

43. (3)

$$T = 2\pi\sqrt{\frac{L}{g}} \Rightarrow T^2 = 4\pi^2\frac{L}{g}$$

$$g = 4\pi^2LT^{-2}$$

$$\frac{dg}{g} \times 100$$

$$= \frac{dL}{L} \times 100 + 2\frac{dT}{T} \times 100 \begin{cases} T = \frac{t}{n} \\ \frac{dT}{T} = \frac{dt}{t} = \frac{1}{50} \end{cases}$$

$$= \frac{0.1}{10.0} \times 100 + 2 \times \frac{1}{50} \times 100$$

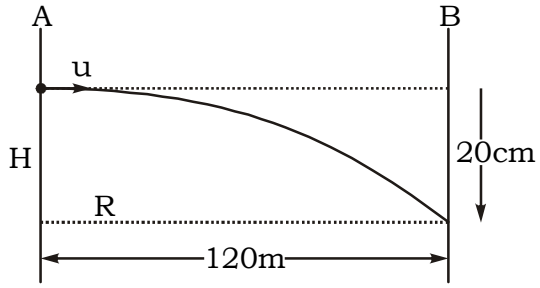
$$= 1 + 4 = 5\%$$

44. (3)

$$\Delta p = mg\Delta t = mg\frac{2u\sin 30^\circ}{g} \begin{cases} \theta = 90 - 60^\circ \\ = 30^\circ \end{cases}$$

$$\Delta p = 4 \times 2 \times 40 \times \frac{1}{2} = 160$$

45. (4)



$$R = u\sqrt{\frac{2H}{g}}$$

$$120 = u\sqrt{\frac{2 \times 0.2}{10}} = u\frac{2}{10}$$

$$u = \frac{120 \times 10}{2} = 600\text{m/s}$$

CHEMISTRY

46. (2) [NCERT XI, PART I, 120,121]

* The hybrid orbitals have same energies
* The number of hybrid orbitals is equal to the number of atomic orbitals that are hybridised.
* Half-filled orbitals and paired orbitals both can participate in hybridisation.
* Atomic orbitals with almost equal energy (comparable energies) undergo hybridization to produce a new set of equivalent hybrid orbitals.

47. (3)

$$\overset{+6}{Xe}F_6 + 2H_2\overset{-2}{O} \longrightarrow \overset{+6}{Xe}\overset{-2}{O}F_4 + 2HF$$

$$\overset{+6}{Xe}F_6 + 2H_2\overset{-2}{O} \longrightarrow \overset{+6}{Xe}\overset{-2}{O}_2F_2 + 4HF$$

$$\overset{+4}{Xe}F_4 + \overset{+1}{O}_2F_2 \longrightarrow \overset{+6}{Xe}F_6 + \overset{0}{O}_2$$

48. (2)

* Orbital Angular momentum of e^{-1} = $\sqrt{l(l+1)}\frac{h}{2\pi}$
* **2p(l = 1)** = $\sqrt{1(1+1)}\frac{h}{2\pi} = \sqrt{2}\frac{h}{2\pi}$
* **1s(l = 0)** = $\sqrt{0(0+1)}\frac{h}{2\pi} = 0$
* **3d(l = 2)** = $\sqrt{2(2+1)}\frac{h}{2\pi} = \sqrt{6}\frac{h}{2\pi}$
* **4f(l = 3)** = $\sqrt{3(3+1)}\frac{h}{2\pi} = \sqrt{12}\frac{h}{2\pi}$

49. (3)

$$\Delta E = h\nu = Rhc\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$$

$$\Delta E = Rhc\left[\frac{1}{1^2} - \frac{1}{6^2}\right] = Rhc \times \frac{35}{36} = 0.97Rhc$$

$$\Delta E = Rhc\left[\frac{1}{4^2} - \frac{1}{5^2}\right] = Rhc \times \frac{9}{400} = 0.0225\ Rhc$$

$$\Delta E = Rhc\left[\frac{1}{5^2} - \frac{1}{6^2}\right] = Rhc \times \frac{11}{900} = 0.0122Rhc$$

$$\Delta E = Rhc\left[\frac{1}{3^2} - \frac{1}{5^2}\right] = Rhc \times \frac{16}{225} = 0.071Rhc$$

50. (1) [NCERT XI, PART I, 125]

* Three P-Cl bonds lie in one plane and two P-Cl bonds lie above and below the equatorial plane.
* The bond angle of three P-Cl bonds is 120° and two P-Cl is 90^0.
* The axial P-Cl bonds are slightly greater than equatorial P-Cl bonds determined as in PCl_5 (240 pm, 202 pm),

51. (2)

* Specify the position and energy of electron -*Principal quantum number (n)*
* The orientations of orbitals - *Magnetic quantum number (m)*
* Describe orbital angular or subshell- *Azimuthal quantum number (l)*
* Account the spin of electron - *Spin quantum number (s)*

52. (3)

HIO_4, $1 + X + 4(-2) = 0 \ \therefore X = +7$

$Cr_2O_7^{2-}$, $2X + 7(-2) = -2 \ \therefore X = +6$

PCl_5, $X + 5(-1) = 0 \ \therefore X = +5$

CO_2 $X + 2(-2) = 0 \ \therefore X = +4$

53. (2) [NCERT XI, PART I, 130]

$Li_2^-(7) = \sigma1s^2 < \overset{*}{\sigma}1s^2 < \sigma2s^2 < \overset{*}{\sigma}2s^1$

$$B.O = \frac{1}{2}[4 - 3] = \frac{1}{2}$$

* $Li_2^+(5) = \sigma1s^2 < \overset{*}{\sigma}1s^2 < \sigma2s^1 < \overset{*}{\sigma}2s^0$

$$B.O = \frac{1}{2}[3 - 2] = \frac{1}{2}$$

* $Li_2(6) = \sigma1s^2 < \overset{*}{\sigma}1s^2 < \sigma2s^2 < \overset{*}{\sigma}2s^0$

$$B.O = \frac{1}{2}[4 - 2] = 1.0$$

$\Rightarrow$ Li_2^+, Li_2^- have same bond order but bond strength of Li_2^- is less due to anti bonding electron.

$\Rightarrow$ When Li_2 change into Li_2^+ then bond strength decreases ($Li_2 > Li_2^+ > Li_2^-$).

54. (4) [NCERT XI, PART I, 49,50]

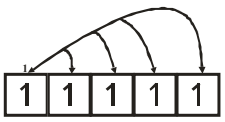
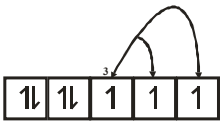
* Wave length (λ) represents wave nature and linear momentum (P = mV) represents particle nature of electron

$$\lambda = \frac{h}{mc} = \frac{h}{p}$$ P = Linear momentum

55. (3) [NCERT XI, PART I, 126]

* Bonding molecular orbital has ***Lower*** energy than antibonding molecular orbital.

56. (1) [NCERT XI, PART I, 65]

(X)  (Y) 

* X, exchange energy is maximum, so stability is more.

57. (1) [NCERT XI, PART II, 241, 245]

$H\underline{Au}Cl_4$, $1 + X + 4(-1) = 0 \quad \therefore X = +3$

$K_2\underline{Ta}F_7$, $2 \times 1 + X + 7(-1) = 0 \quad \therefore X = +5$

$Mg_2\underline{P_2}O_7$, $2 \times 2 + 2X + 7(-2) = 0 \quad \therefore X = +5$

$Na_2\underline{S_4}O_6$ $2 \times 1 + 4X + 6(-2) = 0 \quad \therefore X = +2.5$

58. (1)

* Melting , Boiling point, Enthalpy of vapourisation (ΔH_v) increases in group for hydra acid but NH_3, H_2O, HF have maxiumum value due to intermolecular hydrogen bond.

$H_2S < H_2Se < H_2Te <$ **H_2O**

59. (4)

$$\lambda = \frac{h}{mv} = \frac{h}{p} = \frac{h}{\sqrt{2mE}}$$ E = Kinetic energy

$\sqrt{2mE} = p \Rightarrow 2mE = p^2$

* The kinetic energy of an electron is directly proportional to square of its momentum.

60. (1)

Hydrogen bond between two atoms is formed due to displacement of electrons towards more electronegative atom resulting in fractional positive charge on hydrogen. As $H \longrightarrow F$

61. (2)

* $29 = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^{10}$ = 2, 8, **18,** 1
* $24 = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$ = 2, 8, **13,** 1
* $28 = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^8$ = 2, 8, **16,** 2
* $26 = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$ = 2, 8, **14,** 2

62. (1) [NCERT XI, PART II, 253]

NCERT EXERCISE 7.13 (b)

$HCHO + 2[Ag(NH_3)_2]^+ + 3OH^- \longrightarrow 2Ag + HCOO^- + 4NH_3 + 2H_2O$

* HCHO is oxidised to $HCOO^-$ and $[Ag(NH_3)_2]^+$ is reduced to Ag.

63. (3) [NCERT XI, PART II, 252]

NCERT EXERCISE 7.4

* $\overset{+1}{H}\overset{0}{O}\overset{-1}{F}$

64. (4)

* If $N_b > N_a$, then the molecule is said be stable. However, if $N_b \leq N_a$, then the molecule is considered to be unstable. [N_b = Bonding electron, N_a = Antibonding electron.
* Molecular orbitals are represented by wave functions. A plus sign in an orbital indicates a positive wave function while a minus sign in an orbital represents a negative wave function.

65. (3) [NCERT XI, PART I, 64]

* The outer electronic configuration of chromium atom is **$4s^1 3d^5$**

66. (3) [NCERT XI, PART II, 254]

(NCERT-EXERCISE–7.20)

* Cyanogen in alkaline medium show disproportionation.

$$\overset{+3}{(CN)_2} + 2OH^- \rightarrow \overset{+2}{CN^-} + \overset{+4}{CNO^-} + H_2O$$

67. (2)

* Same group element has same number of electrons in the last or valence shell. As Sn, Pb

68. (1)

* Though the central atom of both NH_3 and H_2O molecules are sp^3 hybridised, yet H–N–H bond angle is greater than that of H–O–H.
* This is because nitrogen atom has one lone pair and oxygen atom has two lone pairs.

Since as number of lone pairs on central atom increases the bond angle decreases.

69. (4)

* Sulphur dioxide can act as oxidising as well as reducing agents in their reactions since oxidation no. of S is +4 which lies in between maximum(+6) and minimum(–2).
* When hydrogen peroxide gives O_2 as one of the product in their reactions then it act as reducing agents.

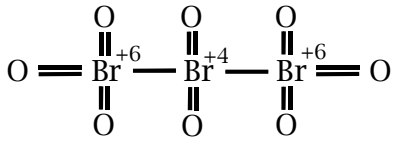
$$H_2O_2 + O_3 \longrightarrow H_2O + 2O_2$$

70. (3)

* $E = N \times \frac{hc}{\lambda} = N \times h \times c \times \bar{\nu} = N \times h\nu$
* Energy of electromagnetic radiation directly depends upon Frequency(ν), wave number($\bar{\nu}$), number of photons(N)

71. (1) [NCERT XI, PART II, 245]

* Br_3O_8



72. (1)

* NO (15) B.O = $\frac{1}{2}[10 - 5] = 2.5$
* CO(14) B.O = $\frac{1}{2}[10 - 4] = 3$
* O_2^{-1} (17) B.O = $\frac{1}{2}[10 - 7] = 1.5$
* O_2 (16) B.O = $\frac{1}{2}[10 - 6] = 2$

73. (1) [NCERT XI, PART II, 240]

* The oxidation number of hydrogen is +1 but in hydrides of metal is -1.

74. (1)

* It means every orbital has 3 electrons therefore s-subshell will have 3 electrons , p-subshell will have 9 electrons. K(19) =$1s^3\ 2s^3\ 2p^9\ 3s^3\ 3p^1$

75. (2)

* $\overset{-1}{N}H_2OH,\ \overset{-3}{N}H_4\overset{+5}{N}O_3,\ \overset{-2}{N}H_2\overset{-2}{N}H_2,\ \overset{-\frac{1}{3}}{N_3}H$

76. (2)

* NaCl being an ionic compound is a good conductor of electricity in the molten state or solution.
* Hybrid orbitals form stronger bonds than pure atomic orbitals.

77. (2)

$$\Delta E = h\nu = Rhc\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$$

$$\nu = Rc\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right] = Rc\left[\frac{1}{1^2} - \frac{1}{2^2}\right] = Rc \times \frac{3}{4}$$

$$= 1.097 \times 10^7 \times 3 \times 10^8 \times \frac{3}{4}$$

$$= 2.468 \times 10^{15}\,Hz = 24.68 \times 10^{14}\,Hz$$

78. (2)

* $SF_4 \Rightarrow$ VSEP = 4+1 = 5 = sp^3d
* $IF_5 \Rightarrow$ VSEP = 5+1 = 6 = sp^3d^2
* $NO_2^+ \Rightarrow$ VSEP = 2+0 = 2 = sp
* $NH_4^+ \Rightarrow$ VSEP = 4+1 = 5 = sp^3

79. (4) [NCERT XI, PART II, 253]

NCERT EXERCISE 7.13 (d)

$$\overset{-2}{N_2}H_4(l) + 2H_2\overset{-1}{O_2}(l) \rightarrow \overset{0}{N_2}(g) + 4H_2\overset{-2}{O}(l)$$

* N_2H_4 - Reducing agent since nitrogen oxidises
* H_2O_2 - Oxidising agent since H_2O_2 reduces

80. (3)

Hydration energy > Lattice energy - **Soluble**

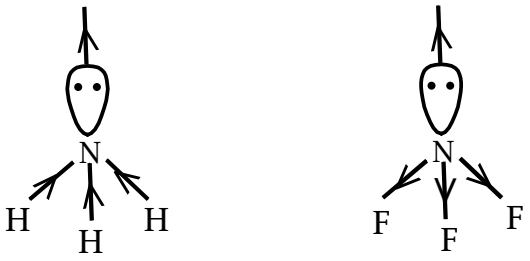
* Hydration energy, Lattice energy both decreases in group but decrease in hydration energy is much greater than decrease in lattice energy therefore solubility decreases in group.

$MgSO_4 > SrSO_4 > BaSO_4 > RaSO_4$

* Compounds which are more soluble have greater value of hydration energy.

81. (1) [NCERT XI, PART I, 112]

* NH_3 and NF_3 molecule have pyramidal shape with a lone pair of electrons on nitrogen atom. The resultant dipole moment of NH_3 is greater than that of NF_3.
* In NH_3 the orbital dipole due to lone pair is in the same direction as the resultant dipole moment of the N-H bonds.



82. (3)

$LiCl < BeCl_2 < BCl_3 < CCl_4$

Covalent character $\propto$ Polarisation

$$\propto \frac{\text{Charge}}{R_{\text{cation}}}$$

* First determine charge of different ions and if charge is same then determine radius.

$Li^+ < Be^{2+} < B^{3+} < C^{4+}$

83. (1)

The boiling point of a compound does depend upon Hydrogen bonding, Size of the molecule, Polarity of the molecule

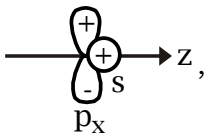
84. (4)

* SO_2 bleaches due to reduction
* Cl_2 bleaches due to oxidation

85. (1) [NCERT XI, PART I, 111,112]

$CH_4(\mu=0) < NF_3 (\mu=0.24D) < NH_3(\mu=1.47D) < H_2O(\mu=1.85D)$

86. (4) [NCERT XI, PART I, 119]



* *Zero overlap*(out of phase due to different orientation direction of approch).

87. (3)

* $F_2^+(17)$, $O_2^-(17)$, Both are iso-electronic therefore both have same bond order(1.5).

88. (1) [NCERT XI, PART I, 109].

* This is factual point that in O_2 and H_2O_2, the O–O bond lengths are 1.21Å and 1.48Å respectively. In ozone, the average O–O bond length is 1.28 Å.

89. (1)

Noble gas configuration, when element belongs to 18 group.

* Group no. = ns + (n-1)d + np

[n = Highest no. of period]

* $[Ar]4s^23d^{10}4p^6\mathbf{5s^24d^{10}5p^6}$

Group no. = 2 + 10 + 6 = 18

* $[Ar]4s^23d^{10}4p^6\mathbf{5s^24d^{10}5p^5}$

Group no. = 2 + 10 + 5 = 17

* $[Ar]4s^23d^{10}4p^65s^24d^{10}5p^6\mathbf{6s^2}$

Group no. = 2 + 0 + 0 = 2

* $[Ar]4s^23d^{10}4p^65s^24d^{10}5p^6\mathbf{6s^1}$

Group no. = 1 + 0 + 0 = 1

90. (1)

Ion-dipole attraction > dipole-dipole attraction > dipole-induced dipole attraction > Dispersion or London attraction

BIOLOGY

91. (1) [NCERT XI, P-121]
During the S-phase, DNA replication takes place. Therefore, the amount of DNA per cell doubles, while the chromosome number remains unchanged.

92. (4) [NCERT XI, P-126]
A. The diplotene stage is characterised by the dissolution of the synaptonemal complex.
B. Recombination does not occur during metaphase. It occurs during the pachytene stage of prophase I of meiosis.
C. During anaphase II, sister chromatids separate, not homologous chromosomes.

93. (2) [NCERT XI, P-121, 122]

94. (4) [NCERT XI, P-121]

95. (1) [NCERT XI, P-121]
During the S-phase, the amount of DNA doubles, but the chromosome number remains 2n. This is because the two sister chromatids of each chromosome remain attached at the centromere.

96. (3) [NCERT XII, P-62, 63 Conceptual]
RRTt × rrtt Gametes produced by the first plant: RT and Rt
Gametes produced by the second plant: rt
RT × rt → RrTt (tall plant with red fruits)
Rt × rt → Rrtt (short plant with red fruits)
Probability of tall plants with red fruits = 1/2 × 100 = 50%.

97. (2) [NCERT XI, P-123, 126, 127]
B. Centromere division and separation of sister chromatids do not occur during anaphase I. They occur during mitotic anaphase and anaphase II of meiosis.

98. (3) [NCERT XI, P-121]
Initial DNA amount = 2C“Initial chromosome number = 2N After the S-phase, DNA amount = 2C × 2 = 4C. The chromosome number remains 2N because the sister chromatids are still joined at the centromere. Therefore, DNA amount = 4C and chromosome number = 2N.

99. (4) [NCERT XI, P-126]

100. (2) [NCERT XI, P-120]
A parent cell divides to produce two daughter cells.

101. (1) [NCERT XII, P-73, 74, 75 Conceptual]
The female parent is heterozygous. This means that she possesses two different alleles of the gene responsible for the trait.

102. (2) [NCERT XI, P-121]
The correct sequence of the cell cycle is: $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$ During G_1, the cell grows. DNA replication occurs during the S-phase. During G_2, the cell prepares for division, and during the M-phase, nuclear division and cytokinesis occur.

103. (4) [NCERT XI, P-126]

104. (3) [NCERT XI, P-123]
By the end of prophase, the nucleolus and nuclear envelope disappear. The Golgi bodies and endoplasmic reticulum also undergo disassembly or reorganisation. According to the marked answer in the source, one structure is observed.

105. (4) [NCERT XI, P-123, 124]
During anaphase, the centromere divides and sister chromatids move towards opposite poles.

106. (3) [NCERT XI, P-126]
II. Pairing occurs between homologous chromosomes, not non-homologous chromosomes.
III. Synapsis takes place between homologous chromosomes.““V. The synaptonemal complex forms between homologous chromosomes, not non-homologous chromosomes.

107. (4) [NCERT XII, P-75, 76]

108. (1) [NCERT XI, P-123, 124]

109. (1) [NCERT XII, P-64, 67, 70, 71 Conceptual]

IV. In *Corvus* (crow), females are ZW and produce two types of ova: Z-bearing ova and W-bearing ova.

110. (4) [NCERT XI, P-123]

Centromere division does not occur at the end of this stage. Centromere division and separation of sister chromatids occur during anaphase.

111. (1) [NCERT XI, P-123, 126]

D. Chiasmata become clearly visible during diplotene. Their terminalisation occurs during diakinesis.

112. (3) [NCERT XII, P-75, 76]

113. (4) [NCERT XI, P-121, 122]

During interphase, chromosomes generally remain in the form of loosely organised chromatin. They are not visible as distinct, highly condensed chromosomes.

114. (2) [NCERT XI, P-120]

Both statements are true. During cell division, the distribution of replicated chromosomes into daughter nuclei involves several coordinated events. These events are under genetic control, but the Reason does not directly explain the Assertion.

115. (4) [NCERT XII, P-59, 73, 74 Conceptual]

IV. A normal male (X^NY) and a carrier female (X^NX^C) do not produce only colour-blind children. The probability of colour blindness is 50% among sons, while the probability of being a carrier is 50% among daughters.

116. (4) [NCERT XI, P-121]

During prophase, chromosomes condense and become clearly visible. In the given diagram, this stage is represented by d.

117. (2) [NCERT XI, P-127]

Both statements are true. After meiosis I, chromosomes may undergo some dispersion, but they do not become completely extended as in a typical interphase nucleus. The Reason does not directly explain the Assertion.

118. (2) [NCERT XI, P-124]

If cytokinesis does not occur after karyokinesis, multiple nuclei may remain within the same cytoplasm. The liquid endosperm of coconut is an example.

119. (2) [NCERT XI, P-122, 123, 124]

120. (2) [NCERT XI, P-123, 124]

I. During anaphase, daughter chromatids move towards opposite poles, not towards the equator.

III. The centromere does not remain directed towards the equator; after the chromatids separate, they move towards opposite poles.

IV. The correct sequence is that the centromere divides first, followed by the separation of sister chromatids.

121. (1) [NCERT XI, P-122 Conceptual]

A replicated chromosome consists of two sister chromatids joined at one centromere. Therefore, even when two chromatids are present, they are counted as one chromosome.

122. (3) [NCERT XI, P-125]

123. (4) [NCERT XI, P-124]

124. (2) [NCERT XI, P-126]

During pachytene, synapsis between homologous chromosomes is complete. Crossing over occurs between non-sister chromatids during this stage.

125. (3) [NCERT XI, P-126]

The correct sequence of events is:

$B \rightarrow A \rightarrow C \rightarrow E \rightarrow D$

B. During leptotene, chromosomes gradually become visible.

A. During zygotene, synapsis occurs between homologous chromosomes.

C. During pachytene, crossing over occurs between non-sister chromatids.

E. During diplotene, the synaptonemal complex dissolves.

D. During diakinesis, chiasmata undergo terminalisation.

126. (1) [NCERT XI, P-127, 128]

During metaphase II, spindle fibres attach to the kinetochores of sister chromatids, not to homologous chromosomes. Homologous chromosomes have already separated during meiosis I.

127. (1) [NCERT XI, P-125, 126, 127, 128 Conceptual]

After the S-phase, a somatic cell has a chromosome number of 2N and a DNA content of 4C. A gamete has a chromosome number of N and a DNA content of 1C. Ratio of chromosome numbers = 2N/N = 2. Ratio of DNA content = 4C/C = 4. Therefore, a somatic cell has twice the number of chromosomes and four times the DNA content of a gamete.

128. (1) [NCERT XI, P-127, 128 Conceptual]

129. (1) [NCERT XI, P-124]

During anaphase I of meiosis, homologous chromosomes separate and move towards opposite poles, while sister chromatids remain attached at their centromeres.

130. (2) [NCERT XII, P-61, 62 Conceptual]

Husband = I^AI^B Wife = I^Ai

Possible offspring genotypes:

I^AI^A, I^Ai, I^AI^B and I^Bi. Possible blood groups: A, AB and B. Therefore, four different genotypes and three different phenotypes are possible.

131. (3) [NCERT XII, P-54, 59, 61]

B. In a heterozygous condition, a recessive allele generally does not express its phenotype when a dominant allele is present.

D. In the F_2 generation of a monohybrid cross, the phenotypic ratio of tall to dwarf plants is 3:1. The traits do not blend with each other.

132. (3) [NCERT XII, P-72]

133. (4) [NCERT XI, P-125]

Meiosis plays an important role in evolution because crossing over and independent assortment generate genetic variation.

134. (3) [NCERT XI, P-126]

I. Leptotene is not the last stage of prophase I; it is the first stage.

II. Leptotene begins when chromosomes start condensing, not after chromosome compaction is complete.

135. (3) [NCERT XII, P-60]

II. Dog flower (Antirrhinum) is an example of incomplete dominance, not multiple allelism. Crossing red-flowered and white-flowered plants produces pink flowers in the F_1 generation.

136. (2) [NCERT XII, P-73 Conceptual]

Normal male = XY

Colour-blind female = X^CX^C

Daughters receive X^C from the father and X^N from the mother. Therefore, all daughters will be carriers. Sons receive Y from the father and X^C from the mother. Therefore, all sons will be colour-blind.

137. (2) [NCERT XII, P-56, 57]

138. (2) [NCERT XII, P-67 Conceptual]

Given recombination frequencies:

a–c = 5%

c–b = 15%

b–d = 9%

Distance between a and b = 5 + 15 = 20%.

Distance between a and d = 20 + 9 = 29%.

These distances match the given frequencies. Therefore, the gene sequence is:

a – c – b – d

139. (1) [NCERT XII, P-61 Conceptual]

Humans are diploid and generally possess two alleles of a gene, one inherited from the mother and the other from the father. For the ABO blood group, three alleles— I^A, I^B and i—are possible, but each individual possesses only two of them.

140. (4) [NCERT XII, P-76 Conceptual]
Down's syndrome results from an extra copy of chromosome 21.

141. (1) [NCERT XII, P-73, 74, 75 Conceptual]
In an autosomal recessive disorder, the genotype of an unaffected carrier is Aa. According to the given pedigree, the probability of an unaffected carrier offspring in the F3 generation is 1/4.

142. (2) [NCERT XII, P-74 Conceptual]
Haemophilia is an X-linked recessive disorder. A son receives the Y chromosome from his father and the X chromosome from his mother. If the mother is a carrier, the probability that a son inherits the affected X chromosome is 1/2. Therefore, the probability = 1/2 × 100 = 50%.

143. (4) [NCERT XI, P-126]
The correct sequence of prophase I is: Leptotene → Zygotene → Pachytene → Diplotene → Diakinesis

144. (1) [NCERT XII, P-62, 63, 64 Conceptual]
The phenotypic ratio of a dihybrid F_2 cross is 9:3:3:1. Parental combinations = 9 + 1 = 10. Recombinant combinations = 3 + 3 = 6. Therefore, the ratio is 10:6.

145. (3) [NCERT XII, P-74, 75 Conceptual]
Polymerisation of mutant haemoglobin does not occur at high oxygen tension; it occurs at low oxygen tension. This may change the shape of RBCs, making them sickle-shaped.

146. (4) [NCERT XII, P-64 Conceptual]
The plant is tall and produces both round and wrinkled seeds. Wrinkled seeds have the genotype rr, so the plant's seed-shape genotype must be Rr. All offspring are tall, so the height genotype must be TT. Therefore, the genotype of the parent is TTRr.

147. (4) [NCERT XII, P-76 Conceptual]
Klinefelter's syndrome generally occurs due to an XXY chromosome constitution. If an ovum containing 24 chromosomes is fertilised by a normal Y-bearing sperm, an XXY offspring may be produced.

148. (3) [NCERT XII, P-70, 71]
II. In birds, males are not heterogametic; they are homogametic (ZZ). Females are heterogametic (ZW).

149. (4) [NCERT XII, P-61 Conceptual]
The genotype of blood group O is ii. A man with blood group AB has the genotype I^AI^B and cannot contribute an i allele. Therefore, under normal ABO inheritance, a man with blood group AB cannot be the biological father of a child with blood group O.

150. (3) [NCERT XII, P-63, 64 Conceptual]
Cross: AaBb × aaBb
Probability of dwarf offspring (aa):
Aa × aa → 1/2 aa
Probability of white flowers (bb):
Bb × Bb → 1/4 bb
Since the two genes assort independently:
P(aabb) = 1/2 × 1/4 = 1/8
Percentage = 1/8 × 100 = 12.5%.

151. (2) [NCERT XII, P-76]
An individual with Klinefelter's syndrome generally has an XXY chromosome constitution and is male. Some secondary sexual characteristics, such as gynaecomastia, may develop.

152. (4) [NCERT XII, P-69]
II. Sickle-cell anaemia is a single-gene disorder, not an example of polygenic inheritance.
III. The ABO blood group is controlled by multiple alleles, not by polygenic inheritance.

153. (3) [NCERT XII, P-61 Conceptual]
Blood group O has the genotype ii. Therefore, both parents must contribute an i allele.
Mother's genotype = I^Ai
Father's genotype = I^Bi
Thus, both parents are heterozygous for their respective blood groups.

154. (2) [NCERT XII, P-75]

II. Pattern baldness is not a characteristic symptom of phenylketonuria.

IV. Cola-coloured urine is not a characteristic symptom of phenylketonuria.

155. (1) [NCERT XII, P-54]

Gregor Mendel conducted his hybridisation experiments on the garden pea (*Pisum sativum*), not on sweet pea.

156. (1) [NCERT XII, P-65]

The three scientists who independently rediscovered Mendel's principles in 1900 were Hugo de Vries, Carl Correns and Erich von Tschermak.

157. (3) [NCERT XII, P-74]

II. Haemophilia is not caused by polyploidy. It is an X-linked recessive disorder caused by a mutation in a gene involved in blood clotting.

158. (4) [NCERT XII, P-74]

In sickle-cell anaemia, the acidic amino acid glutamic acid is replaced by the neutral amino acid valine at the sixth position of the β-globin chain.

159. (3) [NCERT XII, P-60]

RR × rr → All F_1 plants are Rr (pink).

Self-cross of F_1:

Rr × Rr → RR, Rr, Rr, rr

Genotypic ratio = 1:2:1.

Phenotypic ratio = 1 red : 2 pink : 1 white. Therefore, both ratios are 1:2:1.

160. (2) [NCERT XII, P-67]

In Morgan's experiments, linkage between the white-eye and miniature-wing genes was weaker than linkage between the yellow-body and white-eye genes. Weaker linkage results in a higher recombination frequency.

161. (2) [NCERT XI, P-121]

In the human cell cycle, which lasts approximately 24 hours, cell division generally takes about one hour.

162. (3) [NCERT XII, P-64]

This statement represents Mendel's law of independent assortment. According to this law, the segregation of alleles of two gene pairs may occur independently of each other.

163. (3) [NCERT XII, P-63, 64 Conceptual]

Probability of yellow seeds = 1/4.

Probability of inflated pods = 3/4.

According to independent assortment:

P(yellow seeds and inflated pods) = 1/4 × 3/4 = 3/16.

Percentage = 3/16 × 100 = 18.75%.

164. (3) [NCERT XII, P-59]

In a pair of contrasting alleles, one allele may be dominant over the other. Dominance does not mean that one allele is dominant over the other when both alleles are identical.

165. (2) [NCERT XII, P-63, 64 Conceptual]

TT × tt → All F_1 plants are Tt (tall).

Self-cross of F_1:

Tt × Tt = 1 TT : 2 Tt : 1 tt

Probability of dwarf plants = 1/4.

Expected number of dwarf plants among 16 = 16 × 1/4 = 4.

166. (3) [NCERT XII, P-61]

In the ABO blood group system, the I^A and I^B alleles produce different sugar antigens on red blood cells. The i allele does not produce either the A or B antigen.

167. (2) [NCERT XII, P-60]

RR (red) × rr (white) → All F_1 plants are Rr (pink).

Self-cross of F_1:

Rr × Rr → 1 RR : 2 Rr : 1 rr

Therefore, the ratio of red, pink and white flowers in F_2 is 1:2:1.

168. (1) [NCERT XII, P-67]

Genes located very close to each other on the same chromosome are tightly linked. The probability of crossing over between them is low, resulting in a very low recombination frequency.

169. (2) [NCERT XII, P-73]

II. Night blindness may have different causes and inheritance patterns; it cannot generally be treated as a single Mendelian disorder.

IV. Down's syndrome is generally a chromosomal disorder caused by trisomy 21, not a typical Mendelian disorder.

170. (2) [NCERT XII, P-60]

B. If a modified allele produces a non-functional enzyme, the conversion of a substrate into a product may be disrupted, affecting the phenotype.

171. (2) [NCERT XII, P-73, 74 Conceptual]

Both parents have normal vision, but both of their fathers are colour-blind. Therefore, the husband is normal, while the wife is a carrier.

Husband = XY

Wife = X^CX

Possible offspring:

XX → Normal daughter

X^CX → Carrier daughter

XY → Normal son

X^CY → Colour-blind son

Each outcome has a probability of 1/4.

I. Normal son = 1/4

II. Carrier daughter = 1/4

III. Colour-blind son = 1/4

IV. Colour-blind daughter = 0/4

172. (4) [NCERT XI, P-123]

173. (3) [NCERT XII, P-61]

A. In codominance, the F_1 phenotype does not resemble only one parent.

B. In codominance, the F_1 phenotype is not completely unrelated to both parents; both alleles are expressed.

174. (4) [NCERT XII, P-70, 71]

C. In the ZW system, females are heterogametic (ZW), while males are homogametic (ZZ). Therefore, ZW is not an example of male heterogamety.

175. (3) [NCERT XII, P-72]

Consanguineous mating is represented in a pedigree by a double horizontal line connecting the partners.

176. (1) [NCERT XI, P-120]

The cell cycle is the sequence of events in which a cell duplicates its genome, synthesises other cellular components and eventually divides into two daughter cells.

177. (2) [NCERT XII, P-62, 63, 64 Conceptual]

Tt Rr × Tt Rr

Probability of tall plants = 3/4.

Probability of pink flowers = 1/2.

Therefore, the probability of tall plants with pink flowers is:

3/4 × 1/2 = 3/8 = 6/16.

178. (2) [NCERT XII, P-74]

In sickle-cell anaemia, the DNA coding sequence for the sixth amino acid of the ß-globin chain changes from GAG to GTG. The corresponding mRNA codon is GUG, which codes for valine.

179. (4) [NCERT XII, P-75, 76]

A. Substitution is not a usual cause of aneuploidy.

D. Translocation is a structural chromosomal rearrangement and does not necessarily change the chromosome number.

E. Inversion is also a structural rearrangement and does not necessarily change the chromosome number.

180. (4) [NCERT XII, P-61 Conceptual]

B. Mother = I^AI^A, father = I^Bi, child = I^Ai. This is possible because the mother can contribute I^A and the father can contribute i.

E. Mother = I^Ai, father = I^Bi, child = I^Ai. This is also possible because the mother can contribute I^A and the father can contribute i.

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