RJ VISION PVT. LTD. (MOST STABLE & INNOVATIVE INSTITUTE)	FT – 4 ENG	PCB SOLUTION

COURSE NAME: 12TH | **DATE : 01-06-2026**

FT - 4 (FR) (NEET - CBSE, GSEB) (01 - 06 - 2026)

ANSWER KEY

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

PHYSICS:

1. **Sol.(4)**

In p-type semiconductor, trivalent atoms are doped and holes become majority carries and electrons become minority carriers.

2. **Sol.(4)**

The barrier potential on p-n junction is given is

$V_0 = \frac{kT}{q} \text{In}\left(\frac{N_A N_D}{n_i^2}\right)$, here V_0 depends on T, N_A, N_D and n_i (types of semiconductor material)

3. **Sol. (4)**

Coefficient of sliding friction has no dimension.

$f = \mu_s N$

$\Rightarrow \mu_s = \frac{f}{N}$

4. **Sol.(1)**

$\vec{F} = 2\hat{i} + 3\hat{j} - 6\hat{k}$

$\vec{r}_1 = (2\hat{i} - 2\hat{k})$

$\vec{r}_2 = (\hat{i} + \hat{j} - \hat{k})$

$\vec{r} = (\vec{r}_1 - \vec{r}_2) = (2\hat{i} - 2\hat{k}) - (\hat{i} + \hat{j} - \hat{k})$

$= (\hat{i} - \hat{j} - \hat{k})$

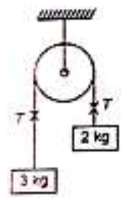
$\vec{\tau} = \vec{r} \times \vec{F} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & -1 & -1 \\ 2 & 3 & -6 \end{vmatrix} = \hat{i}(9) - \hat{j}(-4) + \hat{k}(5)$

$= 9\hat{i} + 4\hat{j} + 5\hat{k}$

5. **Sol.(3)**

Number of images $= \left(\frac{360}{\theta} - 1\right) = \left(\frac{360}{60} - 1\right) = 5$

6. **Sol.(1)**



3g – T = 3a

T – 2g = 2a

a = g/5 = 2m/s^2

displacemetn of 2 kg block

$S = \frac{1}{2}at^2 = \frac{1}{2} \times 2 \times 4 = 4\ m$

$T = 3g - 3a$

$= 30 - 6$

$= 24\ N$

$W = 24 \times 4$

$= 96\ J$

7. Sol. (3)

$r = r_0 \frac{n^2}{Z}$

$\frac{r}{R} = \frac{4^2}{3^2} = \frac{16}{9}$

8. Sol.(4)

$B = \mu_0 H$

$= 4\pi \times 10^{-7} \times 20$

$= 8\pi \times 10^{-6}$ T

9. Sol.(1)

Magnet (1) and (2) will cancel field of each other. Net field will be due to magnet (3)only

$B = \frac{\mu_0}{4\pi}\frac{M}{d^3}$

10. Sol.(1)

The velocity at the bottom will be $\sqrt{4gl}$.

11. Sol.(4)

Action and reaction pair should act on different bodies and should be of same nature.

12. Sol.(4)

$P = v_{rms} J_{rms} \cos\phi$

For maximum power dissipation $\cos\phi = 1$.

13. Sol.(2)

We know, $I = \frac{\varepsilon}{R + r}$ and $V = IR$

Using the equations it can be obtained that

$r = \left(\frac{\varepsilon}{V} - 1\right)R$

14. Sol. (1)

As there is no change in internal energy of the system during an isothermal change. Hence, the energy taken by the gas is utilised by doing work against external pressure. According to FLOT

$\Delta Q = \Delta U + P\Delta V$

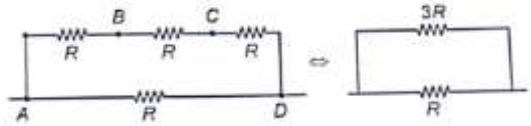
Hence $\Delta Q = \Delta U + P\Delta V;\ \Delta U = 0\ \therefore \Delta Q = P\Delta V$

15. Sol. (1)

$m = \frac{f}{f+u} \Rightarrow -\frac{1}{4} = \frac{30}{30+u} \Rightarrow u = -150\ cm$

16. Sol.(3)

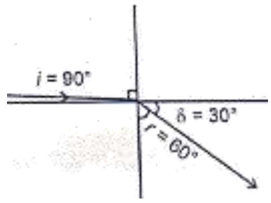
The network can be simplified as



$R_{net} = \left(\frac{1}{3R} + \frac{1}{R}\right)^{-1}$

$R_{net} = \frac{3R}{4}$

17. Sol.(3)



$\mu_1 \sin i = \mu_2 \sin r$

$\Rightarrow 1 \sin 90° = \mu_{med} \sin 60°$

$\Rightarrow 1 = \mu_{med} \frac{\sqrt{3}}{2}$

$\Rightarrow \mu_{med} = \frac{2}{\sqrt{3}}$

18. Sol.(3)

Intensity for a point source $I \propto \frac{1}{r^2}$

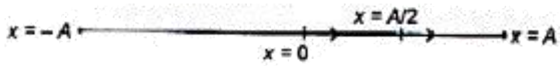
$\therefore \frac{I_2}{I_1} = \left(\frac{r_1}{r_2}\right)^2 \Rightarrow I_2 = \frac{I_1}{25}$ s

$\therefore I_2 = 4 \times 10^{-10}\ W/m^2$

19. Sol.(4)

$y = 2A \tan(kx - \omega t)$ is not finite and continuous for all values of x and t. So, it can't be a wave function.

20. Sol.(3)



$x = A \sin\omega t$

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

$\Rightarrow \sin \omega t = \sin \frac{\pi}{6}$

$t = \frac{\pi}{6\omega} = \frac{\pi 6}{6 \times 2\pi} = \frac{1}{2}$ second. s

21. Sol.(2)

From t = 0 to t = 10 s,

$h_1 = \frac{1}{2} \times 5 \times 10^2 = 250m$.......(I)

After t = 10 s, the rocket will be move under gravity. Therefore, v(t= 10 s) = 5 × 10 = 50 m/s

Using, $2as = v^2 - u^2$

$2 \times (-10) \times h_2 = 0 - (50)^2$

$h_2 = 125$ m….(II)

Maximum height reached by the rocket = $h_1 + h_2$

$\therefore H_{max} = 250 + 125 = 375$ m

22. Sol.(1)

$g' = g - R\omega^2\cos^2\theta$

It is clear from the above equation that due to rotation of earth effective value of acceleration due to gravity decreases.

23. Sol.(4)

Let the reading of the thermometer at 60°C is x.

Then $\frac{x-20^\circ}{80^\circ-20^\circ} = \frac{60^\circ C - 0^\circ C}{100^\circ C - 0^\circ C}$

$x = \frac{60}{100} \times 60 + 20$

$x = 36 + 20 = 56^\circ$

24. Sol. (4)

Thermal capacity $= mc = 40 \times 0.2 = 8\, cal/^\circ C$.

25. Sol.(4)

Electric field inside an spherical charged conducting shell is always zero.

26. Sol.(2)

For SHM, $T = 2\pi,\sqrt{\frac{M}{K}}$

Since spring constant and mass of the block remains same, therefore time period and frequency remain same. But initially when there was no electric field, the mean position was at the point where expansion of spring was zero, now it will shift to the point where Kx = EQ.

27. Sol.(1)

Total energy falling on the surface

$U = 15\ W/cm^2 \times 30\ cm^2 \times 30 \times 60$ s

$= 81 \times 10^4$ W….(i)

Total momentum transfer is

$P = \frac{2U}{c} = \frac{2 \times 81 \times 10^4}{3 \times 10^8}$

Average force exerted on the surface

$F = \frac{\Delta P}{\Delta t} = \frac{2 \times 81 \times 10^4}{3 \times 10^8} \times \frac{1}{30 \times 60} = 3 \times 10^{-6}$ N

28. Sol.(2)

In isobaric process, heat supplied is given by $nC_p\Delta T$ and change in internal energy is given by $nC_v\Delta T$.

29. Sol.(3)

$I_2 = nI_1$

Maximum intensity on interference

$I_{max} = \left(\sqrt{I_1} + \sqrt{I_2}\right)^2$

$I_{,max} = \left(\sqrt{I_1} + \sqrt{nI_1}\right)^2$

$I_{max} = (1+\sqrt{n})^2 I_1 = (1 + n + 2\sqrt{n})\ I_1$

Minimum intensity of interference

$I_{min} = \left(\sqrt{I_1} - \sqrt{I_2}\right)^2$

$I_{min} = \left(\sqrt{I_1} - \sqrt{nI_1}\right)^2$

$I_{min} = \left(1 - \sqrt{n}\right)^2 I_1$

$\frac{I_{max} - I_{min}}{I_{max} + I_{min}} = \frac{2\sqrt{n} - (-2\sqrt{n})}{2(1+n)}$

$\frac{2\sqrt{n}}{n+1}$

30. Sol.(3)

The direction of magnetic lines of force close to a straight conductor carrying current will be circular in a plane perpendicular to the conductor.

31. Sol. (1)

32. Sol.(1)

$E = h\nu$

$\therefore \nu = \frac{pc}{h}$

$= \frac{3.3 \times 10^{-29} \times 3 \times 10^8}{6.6 \times 10^{-34}}$

$= 1.5 \times 10^{13}$ Hz

33. Sol.(1)

It is proportional to pressure.

$B = \gamma P$

34. Sol.(4)

$R_{eq} = R_1 + R_2$ (for series combination)

$= (20 \pm 1) + (10 \pm 1)$

$= (30 \pm 2)\ \Omega$

35. Sol. (3)

36. Sol.(4)

$[v_T] = [M^0L^1T^{-1}]$

$[F] = [MLT^{-2}]$

[Energy density] $= [ML^{-1}T^{-2}]$

[Surface tension] = $[ML^0T^{-2}]$

37. **Sol. (3)**

38. **Sol.(3)**

Center of gravity is the point at which the weight of the body acts. Centre of mass may coincide with centre of gravity.

39. **Sol.(1)**

Let (1) string will break first then a_{max} = 20 m/s^2 in this condition $T_2 = 2 \times 20 + T_1$

= 40 + 20 = 60 N

$T_2 < (T_2)_{max}$ therefore (1) string will break first.

40. **Sol.(2)**

$$i_{rms} = \sqrt{\frac{(4)^2 \times 5 + (-2)^2 \times 5}{10}}$$

$$i_{rms} = \sqrt{\frac{16+4}{2}}$$

$$= \sqrt{\frac{20}{2}}$$

$\sqrt{10}$ A

41. **Sol.(4)**

Let potential at junction be V, then

$$\frac{6-V}{2} + \frac{4-V}{4} + \frac{8-V}{4} = 0$$

12 – 2V + 4 – V + 8 – V = 0

$\therefore$ V = 6 volts

$\therefore$Potential drop across capacitor = 6 – (–10) = 16 V

$\therefore$ charge on capacitor = 16 (1) = 16 μC

42. **Sol.(2)**

We know electric potential decreases in the direction of electric field.

Here, A and B are on same potential while C is ahead of them along electric field.

43. **Sol.(3)**

For refraction through spherical surface

$$\frac{\mu_2}{v} - \frac{\mu_1}{u} = \frac{\mu_2 - \mu_1}{R}$$

$$\Rightarrow \frac{\mu}{2R} - \frac{1}{\infty} = \frac{\mu - 1}{R}$$

$\Rightarrow \mu = 2\mu - 2$

$\Rightarrow \mu = 2$

44. **Sol.(2)**

Number of moles that leaked out from the vessel

$\Delta n = n_i - n_r$

$$= \frac{P_1V}{RT_1} - \frac{P_2V}{RT_2} = \frac{P_1V}{RT_1}\left[1 - \frac{T_1P_2}{P_1 \times T_2}\right]$$

$$= n_i \left[1 - \frac{320 \times 25}{3000 \times 4}\right]$$

$$= \frac{1}{16} \times \left[1 - \frac{2}{3}\right] = \frac{1}{48}$$

Mass of O_2 that leaked out

$\Delta m = \Delta n \times M$

$$= \frac{1}{48} \times 32 = \frac{2}{3} g$$

45. **Sol. (3)**

$$F = \frac{G \times m \times m}{(2R)^2} = \frac{G \times \left(\frac{4}{3}\pi R^3 \rho\right)^2}{4R^2} = \frac{4}{9}\pi^2 \rho^2 R^4$$

$\therefore\ F \propto R^4$

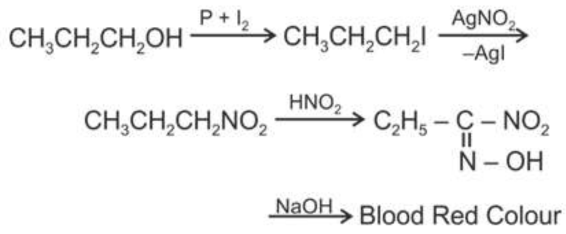
CHEMISTRY:

46. **Sol. (4)**

47. **Sol. (2)**

PCl_5 molecules has trigonal bipyramidal geometry therefore axial P – Cl bonds are longer than equatorial P – Cl bonds.

48. **Sol. (3)**



49. **Sol. (4)**

• H^+ ions has exceptionally high limiting molar conductivity in water at 298 K.

Ion	Ca^{2+}	Br^-	SO_4^{2-}	H^+
$\lambda°$ (S cm^2 mol^{-1})	119	78.1	160	349.6

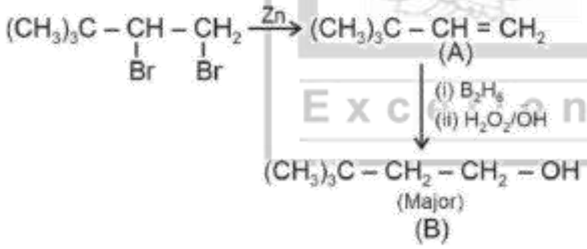
50. **Sol. (4)**

51. **Sol. (2)**

• More branched carbon gets lower number.

• IUPAC name: 3-Ethyl-1,1-dimethylcyclopentane

52. **Sol. (3)**



53. **Sol. (4)**

Cytosine, Thymine and Uracil are pyrimidine bases while Adenine and Guanine are purine bases.

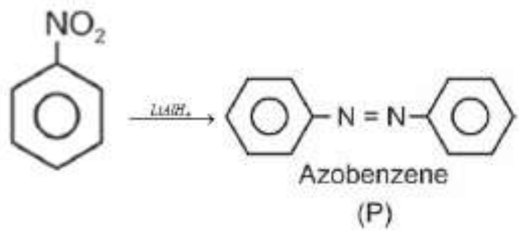
54. **Sol. (4)**

55. **Sol. (4)**

56. **Sol. (1)**

Complex containing only one type of ligands is known as homoleptic complex.

57. **Sol. (4)**



58. **Sol. (1)**

59. **Sol. (1)**

$$HCHO \xrightarrow[(ii) H_3O^+]{(i) RMgX / Dryether} \underset{1° \, Alc.}{R - CH_2 - OH}$$

60. **Sol. (3)**

61. **Sol. (2)**

62. **Sol. (4)**

63. **Sol. (4)**

64. **Sol. (2)**

65. **Sol. (4)**

66. **Sol. (1)**

67. **Sol. (3)**

68. **Sol. (2)**

69. **Sol. (4)**

Heisenberg's uncertainty principle:

$$\Delta x \times \Delta p \geq \frac{h}{4\pi}$$

Where Δx and Δp are uncertainties in position and momentum of electron respectively.

70. **Sol. (1)**

71. **Sol. (2)**

$$W = 2.303 \text{ nRT} \log\left(\frac{V_f}{V_i}\right)$$

$$= -2.303 \times 1 \times 8.314 \times 300 \log\left(\frac{100}{10}\right)$$

$$= -2.303 \times 8.314 \times 300 = -5.744 \text{ kJ}$$

72. **Sol. (2)**

$$Zn(OH)_2 \rightleftharpoons Zn^{2+} + 2OH^-$$

s M (2s + 0.1) M

[$\because$ 2s << 0.1 $\therefore$ 2s + 0.1 $\simeq$ 0.1]

$K_{sp} = [Zn^{2+}][OH^-]^2 = (s)(0.1)^2 = 1 \times 10^{-15}$

$s = 10^{-13}$ M

73. **Sol.(2)**

$$M = \frac{\%w/v \times 10}{(mw)solute} = \frac{6 \times 10}{180} = \frac{1}{3} M$$

74. **Sol. (4)**

During mixing, entropy of system increases hence ΔS will be positive.

75. **Sol. (4)**

76. **Sol. (2)**

Pm (Z = 61) is the only lanthanoid that is radioactive.

77. **Sol. (3)**

$$t_{99.9} = \frac{1}{k} In \frac{100}{100-99.9} = \frac{1}{k} In 1000$$

$$t_{99} = \frac{1}{k} In \frac{100}{100-99} = \frac{1}{k} In 100$$

$$\frac{t_{99.9}}{t_{99}} = \frac{In 1000}{In 100} = \frac{3}{2}$$

78. **Sol. (4)**

$$\alpha = \frac{\Lambda_m}{\Lambda_m^\circ} = \frac{39}{390} = 0.1$$

$$HA \rightarrow A^- + H^+$$

C O O

C–Cα Cα Cα

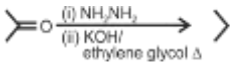
$$K_a = \frac{C\alpha^2}{1-\alpha} = C\alpha^2 = 10^{-3} \times (0.1)^2 = 10^{-5} M$$

79. **Sol. (4)**

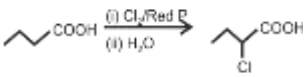

(Furan) is heterocyclic aromatic compound lone/pair of electron on the oxygen atom is delocalised in the ring.

80. **Sol. (4)**

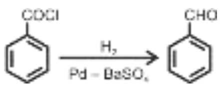
- Wolff-Kishner reduction



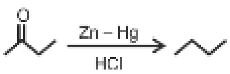
- HVZ reaction



- Rosenmund reduction



- Clemmensen reduction



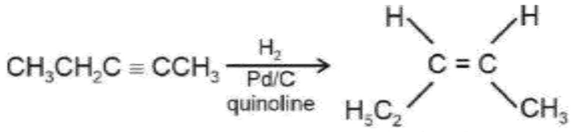
81. **Sol. (1)**

α = It ⇒ $q_e \times n = I \times t$

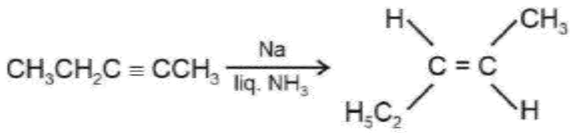
$1.6 \times 10^{-19} \times n = 0.5 \times 2 \times 60 \times 60$

$\therefore n = 2.25 \times 10^{22}$

82. **Sol. (3)**



cis-alkene



trans-alkene

83. **Sol. (1)**

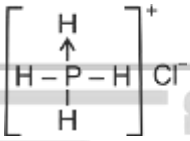
For zero order r = k[A] = k

Therefore r and k have same units.

84. **Sol. (3)**

85. **Sol. (1)**

86. **Sol. (2)**



PH_4Cl contains coordinate, ionic and covalent bonds.

87. **Sol. (3)**

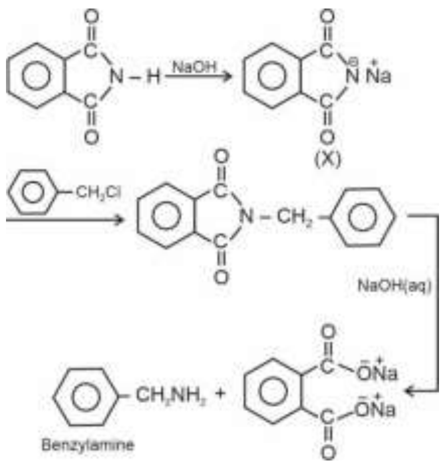
Addition of catalyst only increases the rate of forward and reversed reaction equally.

88. **Sol. (3)**

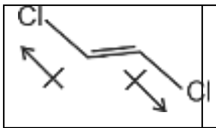
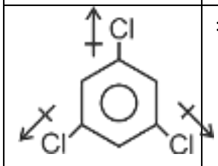
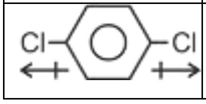
$[Co(en)_2ClBr]I$

cis (Optically active) trans (Optically inactive)

89. **Sol. (2)**



90. Sol. (3)

	⇒	Identical dipole at 180° μ_{net} = 0
	⇒	3identicaldipoleat120°angleh ence μ_{net}=0
	⇒	Identical dipole at 180°μnet = 0