

LEADER TEST SERIES / JOINT PACKAGE / RANK BOOSTER I & II COURSE TARGET : PRE-MEDICAL-2021

Test Type : MAJOR

Test Pattern : NEET (UG)

TEST DATE : 31-08-2021

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
A.	3	3	4	3	1	2	3	1	2	4	3	1	4	3	2	2	3	2	2	2	4	4	2	4	4	1	1	1	1	4	
Q.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	
A.	2	4	3	2	1	2	2	3	2	1	3	4	1	4	4	2	3	3	3	1	1	3	3	2	2	3	1	2	1	2	
Q.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	
A.	3	2	4	4	2	3	1	4	3	4	3	4	4	3	1	4	3	2	4	2	2	2	1	2	1	3	4	4	4	4	
Q.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	
A.	1	3	3	3	2	2	4	1	4	3	3	3	3	4	4	3	3	2	1	2	2	4	2	1	2	3	1	4	2	1	
Q.	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	
A.	3	4	3	3	4	4	4	4	2	2	2	2	2	1	1	2	2	4	4	3	4	2	3	4	4	1	2	1	2	2	
Q.	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	
A.	1	3	1	3	1	1	1	4	4	4	2	3	2	3	3	1	3	1	1	4	2	4	1	4	4	3	2	3	2	3	
Q.	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200											
A.	3	1	4	2	1	2	1	1	3	4	2	1	3	3	3	3	3	4	1	2											

HINT - SHEET

SUBJECT : PHYSICS

SECTION - A

1. Ans (3)

$$[k] = \left[\frac{d^4x}{dt^4} \right] = \frac{[x]}{[T^4]} = \frac{[L]}{[T^4]} = [LT^{-4}]$$

2. Ans (3)

$$26 = u + \frac{19a}{2} \quad \dots(1)$$

$$28 = u + \frac{21a}{2} \quad \dots(2)$$

$$\Rightarrow u = 7 \text{ and } a = 2$$

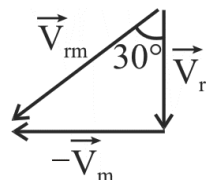
3. Ans (4)

$$\vec{V}_m = 10 \text{ km/hr } \hat{i}$$

$$\vec{V}_r = -V \text{ km/hr } \hat{j}$$

$$\vec{V}_{rm} = \vec{V}_r - \vec{V}_m = \vec{V}_r + (-\vec{V}_m)$$

Using triangle law of addition,



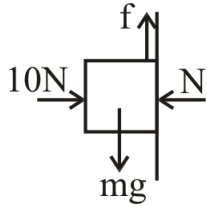
$$\tan 30^\circ = \frac{|-\vec{V}_m|}{|\vec{V}_r|}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{10}{|\vec{V}_r|} \Rightarrow |\vec{V}_r| = 10\sqrt{3} \text{ Km/hr}$$

$$\text{So, } \vec{V}_{rm} = \vec{V}_r - \vec{V}_m$$

$$= -10\sqrt{3} \hat{j} - 10 \hat{i}$$

4. Ans (3)



$N = 10$ (In horizontal direction)

$\Rightarrow f = mg$ (but $f = \mu N$)

$\Rightarrow \mu N = mg \Rightarrow (0.2)(10) = mg$

$\Rightarrow mg = 2N$

5. Ans (1)

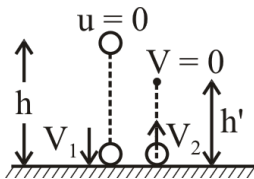
$$F_C = \frac{mv^2}{r} = \frac{mr^2\omega^2}{r} = mr\omega^2 \quad T_{\max} = 10 \text{ N}$$

$$T_{\max} = F_{cp} \Rightarrow 10 = mr\omega^2$$

$$\omega^2 = 400$$

$$\Rightarrow \omega = 20 \text{ rad/sec.}$$

6. Ans (2)



Let ball hit floor by V_1 just before first collision.

Energy conservation :

$$\frac{1}{2}mV_1^2 = mgh$$

$$\Rightarrow V_1 = \sqrt{2gh} \quad \dots(1)$$

$$e = \frac{V_2}{V_1}$$

[V_2 = Velocity with which ball rises after 1st collision]

Let it attains height h' after first collision.

Energy conservation

$$\frac{1}{2}mV_2^2 = mgh'$$

$$\Rightarrow \frac{1}{2}m(eV_1)^2 = mgh'$$

$$\Rightarrow \frac{1}{2}me^2(2gh) = mgh'$$

$$\Rightarrow h' = e^2h \quad \dots(2)$$

So, Total distance travelled before second collision = $h + 2h'$

$$= h + 2e^2h = h(1 + 2e^2)$$

7. Ans (3)

$$V = \sqrt{\frac{2gh}{1 + \frac{K^2}{R^2}}} = \sqrt{\frac{2g\ell \sin \theta}{1 + \frac{2}{5}}}$$

$$V = \sqrt{\frac{10}{7}g\ell \sin \theta}$$

8. Ans (1)

$$\tau = 31.4 = I\alpha = I \times 4\pi$$

$$\therefore I = \frac{31.4}{4\pi} = 2.5 \text{ kg-m}^2$$

9. Ans (2)

$$\vec{E}_g = \frac{-dV}{dx} \hat{i} = -8x \hat{i}$$

$8x$ along $-ve$ x-axis.

10. Ans (4)

According to COME,

$$-\frac{GMm}{R} + \frac{1}{2}mv^2 = 0+0$$

$$\frac{1}{2}mv^2 = \frac{GMm}{R} \Rightarrow v = \sqrt{\frac{2GM}{R}} = \sqrt{\frac{2GMR}{R^2}}$$

$$= \sqrt{2gR}$$

11. Ans (3)

$$B = \frac{-P}{\left(\frac{\Delta V}{V}\right)} \Rightarrow \frac{-\Delta V}{V} = \frac{P}{B}$$

$$= \frac{10^5}{1.25 \times 10^{11}} = 8 \times 10^{-7}$$

12. Ans (1)

$$\text{Rise } h = \frac{2T \cos \theta}{r\rho g}$$

$$g_{\text{moon}} = \frac{1}{6}g_{\text{earth}} \Rightarrow h_{\text{moon}} = 6 h_{\text{earth}}$$

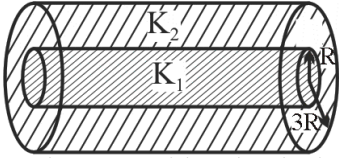
13. Ans (4)

$$\frac{x - MP}{BP - MP} = \frac{^\circ C}{100}$$

$$\Rightarrow \frac{x - 39}{239 - 39} = \frac{39}{100}$$

$$\Rightarrow x = 117 \text{ }^\circ W$$

14. Ans (3)



Both are considered to be in parallel.

$$\text{So, } \frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} \quad \dots\dots(1)$$

$$R_1 = \frac{1}{K_1} \frac{\ell}{\pi R^2}$$

$$R_2 = \frac{1}{K_2} \frac{\ell}{[\pi(3R^2) - \pi R^2]}$$

$$R_{eq} = \frac{1}{K_{eq}} \frac{\ell}{\pi(3R)^2}$$

So, eq.(1) becomes

$$\frac{K_{eq}\pi(9R^2)}{\ell} = \frac{K_1\pi R^2}{\ell} + \frac{K_2(8\pi R^2)}{\ell}$$

$$\Rightarrow 9K_{eq} = K_1 + 8K_2$$

$$K_{eq} = \frac{K_1 + 8K_2}{9}$$

15. Ans (2)

$$\frac{P}{\rho} = \frac{RT}{M_w}$$

$$\rho = \frac{PM_w}{RT}$$

$$\rho = \frac{Pm}{kT} \left[\begin{array}{l} M_w = mN_A \\ \frac{R}{N_A} = k \end{array} \right]$$

$$\frac{R}{N_A} = k$$

16. Ans (2)

$$\Delta U = -W = \frac{nR(T_1 - T_2)}{1 - \gamma}$$

$$= \frac{1 \times 8.3(-8)}{1 - 1.4} = 166 \text{ J}$$

17. Ans (3)

$$W = \frac{\pi}{2} (20) (20) = 200 \pi \text{ J}$$

18. Ans (2)

$$A = A_0 e^{-\frac{b}{2m}t}$$

$$\frac{A_0}{3} = A_0 e^{-\frac{b}{2m}(20)}$$

$$A = A_0 e^{-\frac{b}{2m}(40)}$$

$$= A_0 \left[e^{-\frac{b}{2m}(20)} \right]^2$$

$$= A_0 \left[\frac{1}{3} \right]^2 = \frac{A_0}{9}$$

20. Ans (2)

$$y_1 = a \sin(kx - \omega t)$$

$$y_2 = a \sin(kx + \omega t)$$

According to the principle of superposition, the resultant wave is

$$y = y_1 + y_2$$

$$= a \sin(kx - \omega t) + a \sin(kx + \omega t)$$

Using trigonometric identity

$$\sin(A + B) + \sin(A - B) = 2 \sin A \cos B$$

we get

$$y = 2a \sin kx \cos \omega t$$

21. Ans (4)

If outside charge becomes zero, then also there is electric field due to inside charge.

22. Ans (4)

If two charged are joined by wire and then removed, then charge equally distributed on both.

$$\text{So, finally, } q_1 = \frac{Q}{2} \text{ and } q_2 = \frac{Q}{2}$$

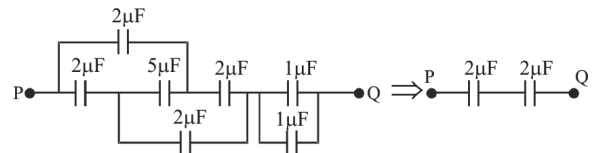
$$\text{So, } F \propto q_1 q_2$$

$$\text{So, } F_{\text{finally}} \propto \frac{Q}{2} \times \frac{Q}{2}$$

$$F_{\text{initially}} \propto (Q) (2Q)$$

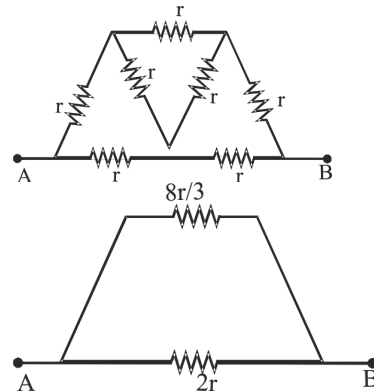
$$\Rightarrow \frac{F_{\text{finally}}}{F_{\text{initially}}} = \frac{1}{8} \Rightarrow F_{\text{finally}} = \frac{F}{8}$$

23. Ans (2)



$$\Rightarrow C_{PQ} = 1 \mu\text{F}$$

24. Ans (4)



Given :

$$R_{AB} = \frac{8}{7} r \text{ [} r = 1 \text{ ohm]}$$

$$R_{AB} = \frac{8}{7} r$$

25. **Ans (4)**

Equivalent EMF of the two batteries x_1 and x_2 in parallel combination is given as

$$\xi = \frac{\xi_1/r_1 + \xi_2/r_2}{1/r_1 + 1/r_2}$$

$$\Rightarrow \xi = \frac{(2/2) + (4/6)}{(1/2) + (1/6)} \Rightarrow x = 2.5V$$

At balancing length we have

$$V_{AN} = \xi$$

$$\Rightarrow J_{AN}(R_{AN}) = \xi$$

$$\Rightarrow \left(\frac{12}{4 + 4 \times 4}\right)(4)(1) = 2.5 \Rightarrow l = \frac{25}{24}m$$

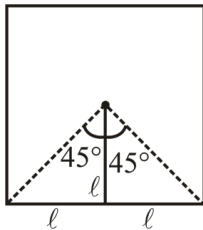
26. **Ans (1)**

$$V = i(R + S)$$

$$20 = (0.01)(20 + S)$$

$$S = 1980 \Omega$$

27. **Ans (1)**



B at centre due to one side

$$B_1 = \frac{\mu_0 i}{4\pi l} (\sin 45^\circ + \sin 45^\circ)$$

$$= \frac{\sqrt{2} \mu_0 i}{4\pi l}$$

B at centre due to all 4 side

$$B_C = 4B_1 = \frac{\sqrt{2} \mu_0 i}{\pi l}$$

due to 'n' turns ; $B_C = \frac{\sqrt{2} \mu_0 ni}{\pi l}$

28. **Ans (1)**

As $\vec{F} = q(\vec{V} \times \vec{B})$

$m\vec{a} = q(\vec{V} \times \vec{B})$

or $\vec{a} = \frac{q}{m}(\vec{V} \times \vec{B})$

So, $\vec{a} \perp \vec{B} \Rightarrow \vec{a} \cdot \vec{B} = 0$

$$\Rightarrow 2x + 3 - 4 = 0$$

$$\Rightarrow \boxed{x = 0.5}$$

29. **Ans (1)**

$$\cot^2 \theta = \cot^2 \theta_1 + \cot^2 \theta_2$$

$$\Rightarrow \cot \theta_2 = \sqrt{\cot^2 \theta - \cot^2 \theta_1}$$

$$\cot \theta_2 = \sqrt{\cot^2 30^\circ - \cot^2 45^\circ} = \sqrt{2}$$

$$\Rightarrow \theta_2 = \cot^{-1}(\sqrt{2})$$

30. **Ans (4)**

All 4 rods becomes parallel and EMF across each = $\frac{1}{2} B \omega l^2$.

31. **Ans (2)**

$$\because Z^2 = A^2 + B^2$$

$$\therefore [Z] = [A] = [B]$$

$$\therefore [AB] = [Z]^2 = [\text{ohm}]^2$$

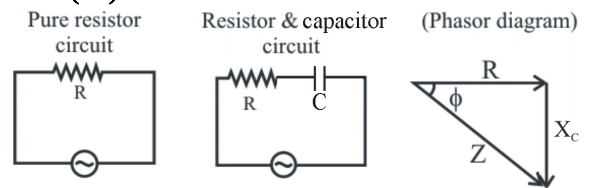
Now,

$$\text{ohm} \equiv \frac{V}{i} \equiv \frac{\text{work}}{\text{ch arg e} \times \text{current}} \equiv \frac{ML^2T^{-2}}{(AT)A}$$

$$= ML^2T^{-3}A^{-2}$$

$$\therefore [AB] = [M^2L^4T^{-6}A^{-4}]$$

32. **Ans (4)**



AC source Impedance = Z

$$P' = V \cdot I \cdot \cos \phi$$

$$P = \frac{V^2}{R} \quad P' = V \cdot \left[\frac{V}{Z}\right] \cdot \cos \phi$$

$$\Rightarrow V^2 = PR \quad P' = \frac{V^2}{Z} \cdot \frac{R}{Z}$$

(From phasor diagram)

$$P' = \frac{(PR)R}{Z^2}$$

$$P' = \left(\frac{R}{Z}\right)^2 P$$

33. **Ans (3)**

Theoretical

34. **Ans (2)**

$$m_\infty = \frac{v_0}{u_0} \times \frac{D}{f_e}$$

From $\frac{1}{f_0} = \frac{1}{v_0} - \frac{1}{u_0}$

$$\Rightarrow \frac{1}{(+1.2)} = \frac{1}{v_0} - \frac{1}{(-1.25)} \Rightarrow v_0 = 30 \text{ cm}$$

$$\therefore |m_\infty| = \frac{30}{1.25} \times \frac{25}{3} = 200$$

35. Ans (1)

$$\frac{1}{v} - \frac{3}{2(30)} = \frac{1 - 3/2}{20}$$

$$\frac{1}{v} - \frac{1}{20} = \frac{-1}{40}$$

$$\frac{1}{v} = \frac{-1}{40} + \frac{1}{20} = \frac{1}{40}$$

$v = 40 \text{ cm}$

SECTION - B

37. Ans (2)

$$\mu = \tan\theta_p \Rightarrow \mu = \tan 60^\circ$$

$$\mu = \sqrt{3}$$

38. Ans (3)

$$\frac{a_1}{a_2} = \frac{4}{3} \Rightarrow \frac{I_1}{I_2} = \frac{a_1^2}{a_2^2} = \frac{16}{9}$$

$$\frac{I_{\max}}{I_{\min}} = \frac{(\sqrt{I_1} + \sqrt{I_2})^2}{(\sqrt{I_1} - \sqrt{I_2})^2} = \frac{49}{1}$$

39. Ans (2)

$$R = R_0 \left(\frac{1}{2}\right)^{t/T_n}$$

$$322 = R_0 \left(\frac{1}{2}\right)^{4/T_n} \quad \dots(1)$$

$$161 = R_0 \left(\frac{1}{2}\right)^{36/T_n} \quad \dots(2)$$

eqⁿ (2) ÷ (1)

$$\left(\frac{1}{2}\right)^1 = \left(\frac{1}{2}\right)^{\left(\frac{36-4}{T_n}\right)}$$

$$1 = \frac{36-4}{T_n}$$

$T_n = 32 \text{ min}$

40. Ans (1)

Total energy = K.E. + Rest mass energy

$$= 0.511 \text{ MeV} + 3.045 \text{ MeV} = 3.556 \text{ MeV}$$

41. Ans (3)

$$2\pi r_n = n\lambda \Rightarrow r_n = \frac{n\lambda}{2\pi}$$

$$r_3 = \frac{3\lambda}{2\pi}$$

42. Ans (4)

Photon exerts pressure

$$P = \frac{I}{C} \text{ (for pure absorption)}$$

$$\text{or } P = \frac{2I}{C} \text{ (for pure reflection)}$$

43. Ans (1)

voltage drop at $1 \text{ k}\Omega = 20 - 12 = 8 \text{ V}$

$$\therefore \text{current through } 1 \text{ k}\Omega = \frac{8}{10^3} = 8 \text{ mA}$$

$$\text{and current through } 2 \text{ k}\Omega = \frac{12}{2 \times 10^3} = 6 \text{ mA}$$

$$\therefore I_z = 8 - 6 = 2 \text{ mA}$$

44. Ans (4)

$$\text{Total } A_v = A_{v_1} \times A_{v_2}$$

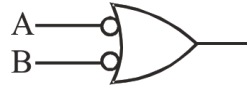
$$= 10 \times 20 = 200$$

$$\text{So, } \frac{\text{Output Signal}}{\text{Input Signal}} = A_v$$

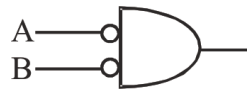
$$\Rightarrow \frac{\text{Output Signal}}{0.01} = 200$$

$$\Rightarrow \text{Output Signal} = 2 \text{ V}$$

45. Ans (4)



$$Y = \overline{A + B} = \overline{A \cdot B} \text{ [NAND]}$$



$$Y = \overline{A \cdot B} = \overline{A + B} \text{ [NOR]}$$

46. Ans (2)

Let the angular velocity be ω , when the insect strikes the rod at C.

By the conservation of angular momentum about O

$$Mv \frac{L}{4} = I_O \omega = \left[\frac{ML^2}{12} + M \left(\frac{L}{4}\right)^2 \right] \omega$$

$$= \frac{7}{48} ML^2 \omega$$

$$\omega = \frac{12v}{7L}$$

47. Ans (3)

$$F = -8 \sin 2x \text{ for small oscillation } F = -16x$$

$$K = 16 \quad T = \frac{2\pi}{4} = \frac{\pi}{2}$$

48. Ans (3)

$$W_{\text{ext}} = q [V_f - V_i]$$

$$= (2\mu\text{C}) \{(-5\text{V}) - (+10\text{V})\}$$

$$= -30\mu\text{J}$$

49. Ans (3)

$$L = \frac{\mu_0 N^2 A}{\ell}$$

$$= \frac{4\pi \times 10^{-7} \times (1200)^2 \times (12 \times 10^{-4})}{48\pi \times 10^{-2}}$$

$$= 1.44 \text{ mH}$$

50. Ans (1)

$$\text{Optical path} = \mu \times \ell$$

$$\Rightarrow \mu_1 \ell_1 = \mu_2 \ell_2$$

$$\Rightarrow \frac{4}{3} \times (6 \text{ cm}) = \mu \times (4 \text{ cm})$$

$$\Rightarrow \boxed{\mu = 2}$$

SUBJECT : CHEMISTRY

SECTION - A

51. Ans (1)

Atomicity = 1

$$\text{Minimum molecular mass} = \frac{\text{atomic mass}}{\% \text{ of element}} \times 100$$

52. Ans (3)

Electronic configuration of Fe

$$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$$

$$n = 3, \ell = 2 \Rightarrow 3d$$

6 e⁻ are present in 3d

53. Ans (3)

$$K_1 = \frac{[\text{NO}_2]}{[\text{NO}][\text{O}_2]^{1/2}} \quad \dots(1)$$

$$K_2 = \frac{[\text{NO}]^2[\text{O}_2]}{[\text{NO}_2]^2} \quad \dots(2)$$

$$\therefore K_2 = \frac{1}{K_1^2}$$

54. Ans (2)

$$K_{\text{SP}} = [\text{Ag}^+]^2 [\text{CrO}_4^{2-}] \text{ for precipitation}$$

$$[\text{Ag}^+]^2 [\text{CrO}_4^{2-}] > K_{\text{SP}}$$

55. Ans (2)

For combustion of 1 mole of benzene

$$\Delta n_g = -1.5$$

$$\Delta H = \Delta U + \Delta n_g RT$$

$$\Rightarrow -3271 = \Delta U - \frac{1.5 \times 8.314 \times 300}{1000}$$

$$\Rightarrow \Delta U = -3267.25 \text{ kJ}$$

For 1.5 mole combustion of benzene

$$\Delta U = -3267.25 \times 1.5$$

$$= -4900.88 \text{ kJ}$$

56. Ans (3)

$$\text{Reducing power} \propto \frac{1}{\text{oxidation number of central atom}}$$

57. Ans (1)

$$d = \frac{M_w}{22.4}$$

$$= \frac{64}{22.4} \text{ g/L}$$

60. Ans (2)

$$R = k(A)^\circ$$

$$R = k$$

61. Ans (3)

In aqueous solution Li⁺ ion has maximum effective size due to maximum solvation while Cs⁺ ion has minimum effective size.

62. Ans (2)

[Pt (NH₃)₄Cl₄] Gives n moles of ions on complete ionisation i.e. a = 1

$$\Delta T = K_f \times \text{molality} \times (1 - \alpha + n\alpha)$$

$$0.0054 = 1.80 \times 0.001 \times (n)$$

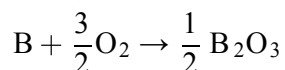
$$\therefore n = 3$$

Thus, [Pt(NH₃)₄Cl₂]Cl₂ → [Pt(NH₃)₄Cl₂]²⁺ + 2Cl⁻

1	0	0
0	1	2

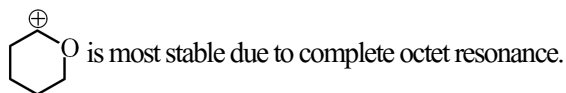
SECTION - B

86. Ans (3)



$$\Delta H = (\Delta H_{\text{comb.}})_B^{\circ} = \frac{1}{2}(\Delta H_f^{\circ})_{B_2O_3}$$

92. Ans (3)

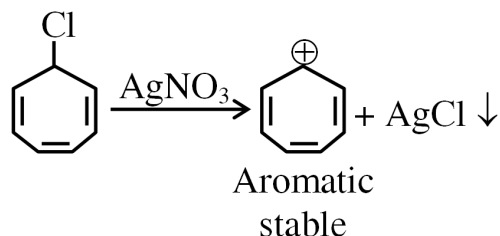


96. Ans (2)

KMnO₄ is coloured due to charge-transfer.

97. Ans (4)

A compound that can form stable carbocation like 3°, allyl, benzyl etc. can react with AgNO₃.



99. Ans (4)

$$K_p = \frac{P_{CO_2}}{(P_{CH_4}) \times (P_{O_2})^2}$$

SUBJECT : BOTANY

SECTION - A

113. Ans (2)

NCERT-XII, Page # 182 (10.2.2)

118. Ans (4)

NCERT Pg. # 284(E), 310 (H) Fig. 16.9.1

121. Ans (3)

NCERT (XII) Supplementary material
Pg # 288(E), 315(H)

125. Ans (4)

NCERT XII, Page No. # 121

130. Ans (2)

NCERT-XI, Page#72 (E+H)

135. Ans (1)

NCERT XII, Page No. # 38(E), 41(H)

SECTION - B

137. Ans (2)

NCERT (XI) Pg. # 43

148. Ans (1)

Module Pg.#92

150. Ans (2)

B & C statement are correct

SUBJECT : ZOOLOGY

SECTION - A

152. Ans (3)

NCERT XI, Page # 108

156. Ans (1)

NCERT Pg. # 57

160. Ans (4)

NCERT Pg. # 259

172. Ans (4)

NCERT Pg # 332

177. Ans (2)

NCERT XII Pg. # 64/71(H)Para:4.5

180. Ans (3)

NCERT (XII) Pg. # 91, Para, 5.6.3

182. Ans (1)

NCERT XIIth Pg # 195

183. Ans (4)

NCERT XII Pg.# 200

SECTION - B

187. Ans (1)

NCERT XI (E)Pg.# 103, para 1

NCERT XI (H)Pg.# 103, para 1

194. Ans (3)

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197. Ans (3)

NCERT(XII) Pg#135/146(H) Para:7.6