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DIVISION: PRE-MEDICAL
Academic session: 2023-24

PERIODIC ASSESSMENT TEST (PAT)

STUDENT SUPPORT BOOKLET (SSB)

Answer Key (AK) | Standard Hints (SH) | Text Solutions (TS) | Weightage Sheet (WS)

CLASS	XII	COURSE NAME	SAFAL	COURSE CODE	MR
PHASE CODE(S)	02MR	TOTAL PAGES	1	BATCH CODE(S)	02MR

Target Examination & Year:

NEET 2024

TEST PATTERN	TEST TYPE	TEST CODE & SEQUENCE
NEET	CUMULATIVE TEST	CT-6

DATE & DAY:
21st January 2024 | Sunday

Duration & Time:
200 Minutes | 12:00 PM to 03:50 PM

Contents:

Scan QR Code for Video Solutions → Coming Soon

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APPLY ONLINE

ANSWER KEY (AK)

PAPER											
PART-A : PHYSICS	Q.No.	1	2	3	4	5	6	7	8	9	10
	Ans.	1	1	2	1	3	2	3	2	3	3
	Q.No.	11	12	13	14	15	16	17	18	19	20
	Ans.	2	3	3	2	4	2	2	2	2	3
	Q.No.	21	22	23	24	25	26	27	28	29	30
	Ans.	4	2	4	2	3	3	2	1	2	2
	Q.No.	31	32	33	34	35	36	37	38	39	40
	Ans.	4	4	2	3	3	4	4	1	4	2
	Q.No.	41	42	43	44	45	46	47	48	49	50
	Ans.	3	2	4	3	2	2	3	1	2	4
PART-B : CHEMISTRY	Q.No.	51	52	53	54	55	56	57	58	59	60
	Ans.	4	1	4	1	2	4	3	4	4	2
	Q.No.	61	62	63	64	65	66	67	68	69	70
	Ans.	3	4	1	3	2	3	4	4	3	2
	Q.No.	71	72	73	74	75	76	77	78	79	80
	Ans.	1	3	3	3	4	2	2	1	4	4
	Q.No.	81	82	83	84	85	86	87	88	89	90
	Ans.	3	2	1	3	4	1	2	3	3	2
	Q.No.	91	92	93	94	95	96	97	98	99	100
	Ans.	1	3	3	2	2	4	4	3	2	4
PART-C : BIOLOGY	Q.No.	101	102	103	104	105	106	107	108	109	110
	Ans.	3	4	4	3	4	3	1	4	2	1
	Q.No.	111	112	113	114	115	116	117	118	119	120
	Ans.	4	1	4	2	4	4	3	4	3	4
	Q.No.	121	122	123	124	125	126	127	128	129	130
	Ans.	4	2	4	3	3	3	4	1	2	2
	Q.No.	131	132	133	134	135	136	137	138	139	140
	Ans.	1	1	4	2	3	2	2	3	1	4
	Q.No.	141	142	143	144	145	146	147	148	149	150
	Ans.	4	2	3	3	3	2	4	3	2	3
	Q.No.	151	152	153	154	155	156	157	158	159	160
	Ans.	3	4	1	2	1	1	3	1	1	1
	Q.No.	161	162	163	164	165	166	167	168	169	170
	Ans.	4	3	4	1	1	1	4	2	2	3
	Q.No.	171	172	173	174	175	176	177	178	179	180
	Ans.	1	4	3	4	2	4	3	1	4	1
	Q.No.	181	182	183	184	185	186	187	188	189	190
	Ans.	2	4	1	3	4	2	2	2	4	3
	Q.No.	191	192	193	194	195	196	197	198	199	200
	Ans.	3	1	3	2	2	2	3	2	4	1

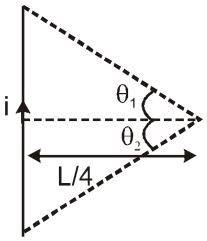
TEXT SOLUTIONS (TS)

PAPER

PART-A: PHYSICS

1. $B = \frac{\mu_0 i}{4\pi R}(\sin\theta_1 + \sin\theta_2)$

$R = \frac{L}{4}$



$\sin\theta_2$

$= \frac{L/2}{\sqrt{(L/2)^2+(L/4)^2}} = \frac{1}{2(\sqrt{1/4+1/16})} = \frac{4}{2\sqrt{5}}$

$\Rightarrow B = \frac{\mu_0 i}{4\pi R}\left(\frac{2\times 4}{2\sqrt{5}}\right) B = \frac{4\mu_0 i}{\sqrt{5}\pi L}$

2. $\cos\theta = \frac{\vec{P}.\vec{Q}}{PQ} = 1 \therefore \theta = 0°$

4. 0

5. $\text{Stress} = \frac{\text{Force}}{\text{Area}} = \frac{N}{m^2}$

प्रतिबल $= \frac{\text{बल}}{\text{क्षेत्रफल}} = \frac{\text{न्यूटन}}{\text{मीटर}^2}$

6. $mv = kg\left(\frac{m}{sec}\right)$

8. $\therefore E = \frac{1}{2}mv^2$

$\therefore$ % Error in K.E.
= % error in mass + 2 × % error in velocity
= 2 + 2 × 3 = 8 %

$E = \frac{1}{2}mv^2 \Rightarrow$ गतिज ऊर्जा में प्रतिशत त्रुटि
= द्रव्यमान में प्रतिशत त्रुटि
+ 2 × वेग में प्रतिशत त्रुटि
= 2 + 2 × 3 = 8 %

9. Percentage error in g = (%error in l) + 2(% error in T) = 1% + 2(3%) = 7%
g में प्रतिशत त्रुटि
=(l में प्रतिशत त्रुटि)+ 2(T में प्रतिशत त्रुटि)
= 1% + 2(3%) = 7%

10. $\frac{2u\sin\theta}{g} = 2\,\text{sec} \Rightarrow u\sin\theta = 10$

$\therefore H = \frac{u^2\sin^2\theta}{2g} = \frac{100}{2g} = 5\text{m}$

12. Horizontal range depends upon angle of projection and it is same for complementary angles i.e. θ and $(90-\theta)$.
क्षैतिज परास प्रक्षेपण कोण पर निर्भर करती है तथा पूरक कोणों अर्थात् θ व $(90-\theta)$ के लिये यह समान होती है।

13. Newton's first law of motion defines the inertia of body. It states that every body has a tendency to remain in its state (either rest or motion) due to its inerta.
न्यूटन का गति विषयक प्रथम नियम जड़त्व को परिभाषित करता है। इसके अनुसार वस्तु में अपने जड़त्व के कारण अपनी वर्तमान अवस्था (विराम अवस्था अथवा गतिज अवस्था) में ही बने रहने की प्रवृत्ति होती है।

15. $T = m(g+a) = 6000(10+5) = 90000\text{N}$

16. Relative velocity of bird w.r.t train $= 25+5 = 30\text{ m/s}$
time taken by the bird to cross the train
$t = \frac{210}{30} = 7\,sec$
रेलगाड़ी के सापेक्ष पक्षी का वेग
$= 25+5 = 30\text{ m/s}$
रेलगाड़ी को पार करने में पक्षी को लगा समय
$t = \frac{210}{30} = 7\,sec$

17. The relative velocity of boat w.r.t. water
नाव का पानी के सापेक्ष, आपेक्षिक वेग
$= v_{boat} - v_{water} = (3\,\hat{i}+4\,\hat{j}) - (-3\,\hat{i}-4\,\hat{j})$
$= 6\,\hat{i}+8\,\hat{j}$

18. Distance travelled by train in first 1 hour is 60 km and distance in next 1/2 hour is 20 km.
So Average
speed $= \frac{\text{Total distance}}{\text{Total time}} = \frac{60+20}{3/2}$
$= 53.33\text{ km/hour}$
पहले 1 घण्टे में रेलगाड़ी द्वारा तय की दूरी 60 किमी है तथा अगले 1/2 घंटे में तय की गयी दूरी 20 किमी है
इसलिये औसत चाल $= \frac{\text{कुल दूरी}}{\text{कुल समय}} = \frac{60+20}{3/2}$
$= 53.33\text{ km/hour}$

19. Average velocity =0 because net displacement of the body is zero.
Average speed

$$= \frac{\text{Total distance covered}}{\text{Time of flight}} = \frac{2H_{max}}{2u/g}$$

$$\Rightarrow v_{av} = \frac{2u^2/2g}{2u/g} \Rightarrow v_{av} = u/2$$

Velocity of projection = v (given)

$$\therefore \quad v_{av} = v/2$$

औसत वेग =0,
क्योंकि वस्तु का कुल विस्थापन शून्य है

$$\text{औसत चाल} = \frac{\text{कुल तय की गयी दूरी}}{\text{उड्डयन काल}} = \frac{2H_{max}}{2u/g}$$

$$\Rightarrow v_{av} = \frac{2u^2/2g}{2u/g} \Rightarrow v_{av} = u/2$$

प्रक्षेपण वेग = v (दिया गया है) $\Rightarrow \quad v_{av} = v/2$

20. $\mu_r < \mu_k < \mu_s$

21. We know that a

$$= \mu g = 0.2 \times 9.8 = 1.96\ m/s^2$$

हम जानते हैं, कि a

$$= \mu g = 0.2 \times 9.8 = 1.96\ m/s^2$$

22. Work done $= mgh = 10 \times 9.8 \times 1 = 98J$

23. In a round trip work done is zero only when the force is conservative in nature.
Force is always required to move a body in a conservative or non-conservative field
एक पूर्ण चक्कर लगाने में किया गया कार्य केवल तभी शून्य होता है, जबकि बल की प्रकृति संरक्षी होती है। किसी वस्तु के संरक्षी अथवा असंरक्षी क्षेत्र में गति करने के लिए हमेशा बल की आवश्यकता होती है।

24. $\omega = \frac{v}{r} = \frac{10}{100} = 0.1 rad/s$

25. K.E. $= \frac{1}{2}mv^2$. Which is scalar, so it remains constant.

K.E. $= \frac{1}{2}mv^2$, जो कि अदिश है इसलिये यह नियत रहेगी।

26. $\frac{e}{m} = \frac{1.6 \times 10^{-19}}{9.1 \times 10^{-31}} = 1.76 \times 10^{11} C/kg$

27. $F_a = \frac{q_1 q_2}{4\pi\varepsilon_0 r^2}, F_b = \frac{q_1 q_2}{K 4\pi\varepsilon_0 r^2} \Rightarrow F_a : F_b = K : 1$

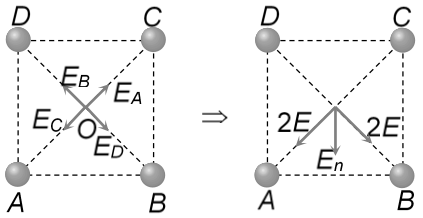
28. $F = \frac{kQ^2}{r^2} = 9 \times 10^9 \times 1^2 \times \frac{1}{(1000)^2} = 9 \times 10^3 N$

29. By using $E = 9 \times 10^9 \times \frac{Q}{R^2}$

$$\Rightarrow 3 \times 10^6 = 9 \times 10^9 \times \frac{Q}{(3)^2}$$

$\Rightarrow$ Q =k 3 × 10^{-3} C

30.



$E_A = E, E_B = 2E, E_C = 3E, E_D = 4E$

32. $g = \frac{4}{3}\pi\rho GR \therefore \frac{g_1}{g_2} = \frac{R_1\rho_1}{R_2\rho_2}$

33. $g' = g\left(1 - \frac{d}{R}\right) \Rightarrow \frac{g}{4} = g\left(1 - \frac{d}{R}\right) \Rightarrow d = \frac{3}{4}R$

34. $g = \frac{GM}{R^2} \therefore g \propto \frac{M}{R^2}$

According to problem

$M_p = \frac{M_e}{2}$ and $R_p = \frac{R_e}{2}$

$$\therefore \frac{g_p}{g_e} = \left(\frac{M_p}{M_e}\right)\left(\frac{R_e}{R_p}\right)^2 = \left(\frac{1}{2}\right) \times (2)^2 = 2$$

$\Rightarrow g_p = 2g_e = 2 \times 9.8 = 19.6\ m/s^2$

35. Potential energy of system of two mass

$$U = \frac{-GMm}{R}$$

$$= \frac{-6.67 \times 10^{-11} \times 100 \times 10 \times 10^{-3}}{10 \times 10^{-2}}$$

$U = -6.67 \times 10^{-10} J$

So, the amount of work done to take the particle up to infinite will be 6.67×10^{-10} J

दो द्रव्यमानों के निकाय की स्थितिज ऊर्जा

$$U = \frac{-GMm}{R}$$

$$= \frac{-6.67 \times 10^{-11} \times 100 \times 10 \times 10^{-3}}{10 \times 10^{-2}}$$

$U = -6.67 \times 10^{-10} J$

अतः कण को अनन्त तक ले जाने में किया गया कार्य 6.67×10^{-10} J

36. If E be electric field, then current density
j = σE

Also we know that current density $j = \frac{i}{A}$

Hence j is different for different area of cross-sections. When j is different, then E is also different. Thus E is not constant. The drift velocity v_d is given by $v_d = \frac{j}{ne}$ = different for different j values. Hence only current i will be constant.

यदि E विद्युत क्षेत्र है तब धारा घनत्व $j = \sigma E$

एवं धारा घनत्व $j = \frac{i}{A}$

अतः अलग-अलग अनुप्रस्थ काट के लिए j अलग-अलग होगा तब E भी अलग–अलग होगा। अतः E नियत नहीं है। अनुगमन वेग $v_d = \frac{j}{ne}$; j के बदलने पर बदलेगा। अतः केवल धारा i नियत रहेगी।

37. In stretching of wire $R \propto \frac{1}{r^4}$

तार को खींचने पर, $R \propto \frac{1}{r^4}$

38. $R \propto I^2 \Rightarrow \frac{R_1}{R_2} = \left(\frac{I_1}{I_2}\right)^2 \Rightarrow \frac{R}{R_2} = \left(\frac{I}{I/2}\right)^2 = 4 \Rightarrow R_2 = \frac{R}{4}$

39. All of these
उपरोक्त सभी

40. Current flowing in the circuit

$i = \frac{E}{R} = \frac{10-4}{20+10} = \frac{1}{5}A$

P.D. across $AC = \frac{1}{5} \times 20 = 4V$

P.D. across AN = 4 + 4 = 8V

परिपथ में प्रवाहित धारा $i = \frac{E}{R} = \frac{10-4}{20+10} = \frac{1}{5}A$

AC के सिरों पर विभवान्तर $= \frac{1}{5} \times 20 = 4V$

AN के सिरों पर विभवान्तर = 4 + 4 = 8V

42. Thermal conductivity of composite plate

$K_{eq} = \frac{2K_1K_2}{K_1+K_2} = \frac{2\times2\times3}{2+3} = \frac{12}{5} = 2.4$

संयुक्त प्लेट की ऊष्मीय चालकता

$K_{eq} = \frac{2K_1K_2}{K_1+K_2} = \frac{2\times2\times3}{2+3} = \frac{12}{5} = 2.4$

43. $\frac{Q}{t} = \frac{kA(\Delta\theta)}{l} \Rightarrow \frac{Q}{t} \propto \frac{A}{l} \propto \frac{r^2}{l}$

$\Rightarrow \frac{(Q/t)_1}{(Q/t)_2} = \left(\frac{r_1}{r_2}\right)^2 \times \frac{l_2}{l_1} = \left(\frac{2}{1}\right)^2 \times \left(\frac{4}{1}\right) = \frac{16}{1}$

46. $V_{Big} = n^{2/3}v_{small} = (1000)^{2/3}v_{small} = 100\,v_{small}$

$V_{बड़ी} = n^{2/3}v_{छोटी} = (1000)^{2/3}v_{छोटी} = 100\,v_{छोटी}$

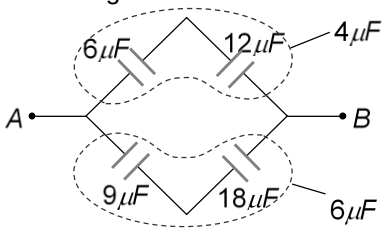
47. $C = 4\pi\varepsilon_0 R$, $R = \frac{C}{4\pi\varepsilon_0}$

$\Rightarrow R = (1/9)\times9\times10^9 = 10^9 m$

48. $U = \frac{1}{2}CV^2 = \frac{1}{2}\times50\times10^{-6}\times(10)^2 = 2.5\times10^{-3}J$

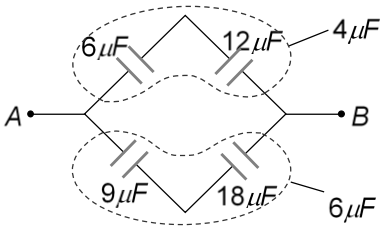
49. $F = \frac{CV^2}{2d} = \frac{Q\times E}{2} = \frac{10^{-6}\times10^5}{2} = 0.05N$

50. Given circuit can be drawn as follows. It is a balance whetstone bridge type network, hence 24 μF capacitor can be neglected



Equivalent capacitance between A and B = 4 + 6 = 10μF.

दिये गये परिपथ को निम्न प्रकार पुनः बनाया जा सकता है यह एक संतुलित व्हीटस्टोन सेतु है, अतः 24 μF धारिता वाले संधारित्र को हटाया जा सकता है



A और B के मध्य तुल्य धारिता = 4 + 6 = 10μF

PART-B: CHEMISTRY

51. $\Lambda^o_{m(NH_4OH)} = \Lambda^o_{m(NH_4Cl)} + \Lambda^o_{m(NaOH)} - \Lambda^o_{m(NaCl)}$.

52. SRP↑ ⟶ Strong

I^- donate electron so strongest reducing agent.

53. $\lambda^0_M = \lambda^0_{CH3COONa} + \lambda^0_{HCl} - \lambda^0_{NaCl}$

$= 91 + 425.9 - 126.4$

$= 390.5$

54. $H_2 \uparrow \longrightarrow 2H^+ + 2e^-$

1 atm 10^{-10}

$E_{OP} = +0.591 \times pH$

$E_{OP} = +0.591 \times 10$

$= 0.591$ V

55. $\alpha = \frac{\Lambda_M}{\Lambda_M^\infty} = \frac{9.54}{238} = 0.04008 = 4.008\ \%$

56. Zn^{2+} (aq) + $2e^- \longrightarrow$ Zn(s) ; $E^o = -0.76$ V (Anode)

Ag_2O (s) + H_2O (l) + $2e^- \longrightarrow 2Ag(s) + 2OH^-$ (aq) ; $E^o = 0.34$ V (Cathode)

$E^o_{cell} = E^0_{SRP}$ (cathode) $- E^0_{SRP}$ (anode)

$= 0.34 - (-0.76) = 1.10$ V

57. $MnO_4^{2-} \longrightarrow MnO_4^-$

0.1 mole

v.f. = 1

$\frac{W}{E} = \frac{Q}{96500}$ = mole × vf

$Q = 96500 \times$ mole $\times$ vf

$= 96500 \times 0.1 \times 1 = 96500$ C

58. $2H_2O \longrightarrow O_2 + 4H^+ + 4e^-$

vf = 4

$n_{O_2} = \frac{5600}{22400} = \frac{1}{4}$

$\frac{W_{Ag}}{E_{Ag}}$ = mole × vf of O_2

$\frac{w_{Ag}}{108} \times 1 = \frac{w_{O_2}}{M_{O_2}} \times 4$

$\frac{w_{Ag}}{108} = \frac{1}{4} \times 4$

$w_{Ag} = 108$ g

59. Fuel cell convert chemical energy of fuel like H_2, CH_4 into electrical energy

60. $2H^+_{(aq.)} + 2e^- \longrightarrow H_2$ (reduction reaction) (अपचयन अभिक्रिया)

In pure water $[H^+] = 10^{-7}$ mole/Litre

$E = E^o - \frac{0.059}{2} \log \frac{P_{H_2}}{\left[H^+_{(aq.)}\right]^2}$

$0 = 0 - \frac{0.059}{2} \log \frac{P_{H_2}}{\left[10^{-7}\right]^2}$

(In order to make log1 = 0)

(log1 = 0 करने के लिए)

$P_{H_2} = (10^{-7})^2$

$= 10^{-14}$ atm

61. M = 0.5 mole/Litre

$K = 5.76 \times 10^{-3}$ S cm^{-1}

$\lambda^o_M = \frac{k \times 1000}{M} = \frac{5.76 \times 10^{-3} \times 1000}{0.5}$

$= 11.52$ S cm^2 mol^{-1}.

62. $\frac{W}{E} = \frac{I \times t}{96500}$ = Number of mole of e^-

number of mole $e^- = \frac{1 \times 60}{96500}$

number of $e^- = \frac{6}{9650} \times 6.02 \times 10^{23}$

$= 3.75 \times 10^{20}$

63. $E^\circ_{Zn^{+2}/Zn} = -0.76$ V

$E^\circ_{Fe^{+2}/Fe} = -0.44$ V

Zn has higher negative SRP (Standard reduction potential) so it work as anode and protect iron to make iron as cathode.

64. $Zn \longrightarrow Zn^{+2}$ (0.01 M)

Cu^{+2} (1 M) $\longrightarrow$ Cu (E_1)

and Zn $\longrightarrow$ Zn^{+2} (1.0 M)

$CuSO_4$ (0.01 M) $\longrightarrow$ Cu (E_2)

Nernst equation for the given cell representation is given as

$$E = E^o - \frac{0.0591}{2} \log \frac{\left[Zn^{2+}\right]}{\left[Cu^{2+}\right]}$$

Value of EMF will be greater if

$\left[Cu^{2+}\right] > \left[Zn^{2+}\right]$.

65. $\frac{1}{2}\frac{d[c]}{dt} = -\frac{1}{3}\frac{d[D]}{dt} = \frac{1}{A}\frac{d[A]}{dt} = \frac{-d[B]}{dt}$

B & Dwill be same side and A & C will be same state ratio of stoichiometric coefficient

B:D: A : C = 1 : 3 : 4 : 2.

$\frac{1}{2}\frac{d[c]}{dt} = -\frac{1}{3}\frac{d[D]}{dt} = \frac{1}{A}\frac{d[A]}{dt} = \frac{-d[B]}{dt}$

B व D तथा A व C दोनो समान ओर के रससमीकरणमितिय गुणांक अनुपात होगें

B:D: A : C = 1 : 3 : 4 : 2.

+ve product

+ve वाले product

66. $-\frac{d[NH_3]}{dt} = 2.5 \times 10^{-4}$

$r = -\frac{d[N_2]}{dt} = -\frac{1}{3}\frac{d[H_2]}{dt} = \frac{1}{2}\frac{d[NH_3]}{dt}$

$r = +\frac{1}{2}\frac{d(NH_3)}{dt} = \frac{1}{2} \times 2.5 \times 10^{-4}$

$= 1.25 \times 10^{-4}$

$-\frac{d[H_2]}{dt} = 3r$

$= 3 \times 1.25 \times 10^{-4} = 3.75 \times 10^{-4}$

67. $\lambda^{\infty}_{M(CH_3COOH)} \rightleftharpoons \lambda^{\infty}_{CH_3COO^-} + \lambda^{\infty}_{H^+}$

……(1)

$x = \lambda^{\infty}_{M}\left(H_2SO_4\right) \rightleftharpoons \lambda^{\infty}_{SO_4^{2-}} + 2\lambda^{\infty}_{H^+}$

……(2)

$y = \lambda^{\infty}_{M}\left(K_2SO_4\right) \rightleftharpoons \lambda^{\infty}_{SO_4^{2-}} + 2\lambda^{\infty}_{H^+}$

……(3)

$Z = \lambda^{\infty}_{M}\left(CH_3COOH\right) \rightleftharpoons \lambda^{\infty}_{CH_3COO^-} + \lambda^{\infty}_{K^+}$

……(4)

eq^n (1) = eq^n (4) + $\frac{1}{2}$ eq^n (2) – $\frac{1}{2}$ eq^n (3)

$= Z + \frac{1}{2}(x) - \frac{1}{2}\, y$

$= \frac{x-y}{2} + z$

68. $Ca^{2+} + 2e^- \longrightarrow Ca$

1F $\left(\frac{20}{40}\right)$ = 0.5 mole

number of Faraday = $\frac{W}{E} = \frac{20}{40/2} = 1$

69. According to electrochemical series Au has max. positive SRP value.

ECS order K ; Mg; Fe; Au (more positive SRP)

70. In typical fuel cell :

Reactant = H_2 and O_2

product = H_2O

71. 2-Bromo methyl-3-oxo hexanamide

2-ब्रोमो मेथिल-3-ऑक्सोहेक्सेनैमाइड

72.

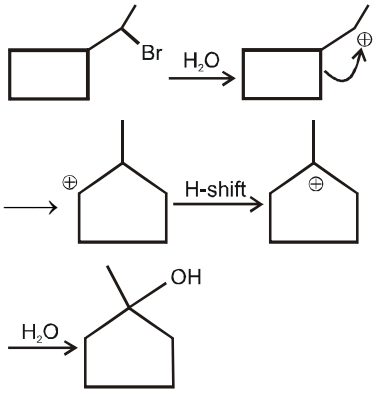
Equimolar amount of (1) & (2)

(1) व (2) का समतुल्य मिश्रण

73. 1-Phenylethyl ethanoate

1-फेनिल ऐथिल ऐथेनोऐट

74.



75. 4

76. 2 times

2 गुना

77. 3

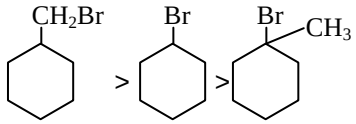
78. Two, one

दो, एक

79. All the three above

उपरोक्त तीनों

80.



81. $-OCH_3 > -OH > -COOH > -CHO$

82. B < Be < C < O < N

83. III > II > I > IV

84. Ionic radii $\propto$ charge on anion

$$\propto \frac{1}{\text{charge on cation}}$$

During the formation of a cation, the electrons are lost from the outer shell and the remaining electrons experience a great force of attraction by the nucleous, ie, attracted more towards the nucleous. In other words, nucleous hold the remaining electrons more tightly and this results in decreased radii.

However, in case of anion formation, the addition of electron(s) takes place in the same outer shell, thus the hold of nucleous on the electrons of outer shell decreases and this results in increased ionic radii.

Thus, the correct order of ionic radii is

आयनिक त्रिज्या $\propto$ ऋणायन पर आवेश

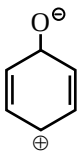
$$\propto \frac{1}{\text{धनायन पर आवेश}}$$

धनायन के निर्माण के दौरान बाह्तम कोश से इलेक्ट्रॉन त्यागे जाते है तथा शेष हुए इलेक्ट्रॉन पर नाभिकीय के द्वारा आकर्षण बल अनुभव होता है। नाभिक की तरफ अधिक आकर्षण होता है। दूसरे शब्दों में नाभिक शेष बचे हुए इलेक्ट्रॉनों को बांधे रखता है तथा इसके परिणामस्वरूप त्रिज्या घटती है। फिर भी ऋणायन के निर्माण में समान बाह्तम कोश में अतिरिक्त इलेक्ट्रॉन जुड़ता है। इस प्रकार बाह्कोश के इलेक्ट्रॉन पर नाभिकीय आकर्षण घटता है तथा परिणामस्वरूप आयनिक त्रिज्या में वृद्धि होती है।

इस प्रकार आयनिक त्रिज्या का सही क्रम है।

$S^{2-} > Cl^- > K^+ > Ca^{2+}$

85.



86. $\lambda^{\infty}_{m(NaCl)} = 126.45\ cm^2\ mol^{-1}$

$\lambda^{\infty}_{m(HCl)} = 426.16\ cm^2\ mol^{-1}$

$\lambda^{\infty}_{m(CH_3COOH)} = ?$

$\lambda^{\infty}_{m(CH_3COOH)} = \lambda^{\infty}_{m(CH_3COONa)} + \lambda^{\infty}_{m(HCl)} - \lambda^{\infty}_{m(NaCl)}$

$= 91 + 426.16 - 126.45$

$= 390.71\ S\ cm^2\ mole^{-1}$

87. $\alpha = \frac{\lambda^C_M}{\lambda^{\infty}_M} = \frac{\lambda^C_M}{\lambda^{\infty}_{(H^+)} + \lambda^{\infty}_{CH_3COO^-}} = \frac{20}{350+50}$

$= \frac{20}{400} = \frac{1}{20}$

$K_a = \frac{C\alpha^2}{1-\alpha}$

$\boxed{K_a = C\alpha^2}$

$= 0.007 \times \left(\frac{1}{20}\right)^2 = \frac{7\times10^{-3}}{400}$

$K_a = \frac{7}{4} \times 10^{-5} = 1.75 \times 10^{-5}$ mol/lt

88. $M = \frac{k\times1000}{\wedge_m} = \frac{k+1000}{x+y}$ mol/L

$= \frac{k\times1000}{x+y} \times 188$ g/L

89. $E^o_{cell} = \left(E^o_{RP}\right)_C - \left(E^o_{RP}\right)_A$

$= E^o_{MnO_4^-|Mn^{2+}} - E^o_{O_2|H_2O}$

$= 1.51 - 1.223 = 0.287$

As E^o_{cell} is positive so $E^0_{MnO_4^-}$ Liberate O_2 form water.

90. $E^0_{Cu^{2+}/Cu} = 0.34$ V

$E^0_{Zn^{2+}/Zn} = -0.76$ V

$E^0_{Fe^{2+}/Fe} = -0.44$ V

$E^0_{Ag^+/Ag} = 0.80$ V

Reaction which not occur:

(1) $E^0_{cell} = -0.44 - (-0.76) =$ +ve possible

(2) $E^0_{cell} = 0.34 - (+0.80) =$ –ve not possible

(3) $E^0_{cell} = 0.34 - (-0.76) =$ +ve possible

(4) $E^0_{cell} = 0.34 - (-0.44) =$ +ve possible

91. $Ni(s) + 2Ag^+ (0.001\ M) \rightarrow Ni^{2+} (0.001\ M) + 2\ Ag(s)$

0.001M 0.001M

$E_{cell} = E^0_{cell} - \frac{0.059}{2} \log \frac{[Ni^{2+}]}{[Ag^+]^2}$

$1.05 - \frac{0.059}{2} \log \frac{10^{-3}}{(10^{-3})^2}$

$= 1.05 - \frac{0.059}{2} \log 10^3$

$= 1.05 - \frac{0.059}{2} \times 3 = 1.05 - 0.0885$

$= 0.9615$ V Ans. = 1

Note : In this question E^0_{cell} is given as 10.5 V but actually it is 1.05 V so it is typing error so question shows be Bonous.

92. formula $\Delta G° = -nF E^{\circ}_{cell}$

सूत्र $\Delta G° = -nF E^{\circ}_{cell}$

(a) n = 6 $\therefore \Delta G° = -6 \times F \times 0.404$

$= -2.424$ F

(b) n = 2 $\therefore \Delta G° = -2 \times F \times 1.211$

$= -2.422$ F

(c) n = 3 $\therefore \Delta G° = -3 \times F \times 0.807$

$= -2.421$ F

93. $E^{\circ}_{CO^{+2}/CO^{+3}} = -1.81$ V

$\Rightarrow E^{\circ}_{CO^{+3}/CO^{+2}} = 1.81$ V

$E^{\circ}_{Al/Al^{+3}} = +1.66\ V \Rightarrow E^{\circ}_{Al^{+3}/Al} = -1.66$ V

For feasible redox reaction :

व्यवहार्य रेडक्स प्रतिक्रिया के लिए :

$E^{\circ}_{cell} = (SRP)_{cathode} - (SRP)_{anode}$

$E^{\circ}_{cell} = 1.81 - (-1.66)$

$E^{\circ}_{cell} = +3.47\ V$

94. $\Delta G^{\circ} = -nF \cdot E^{o}_{cell}$

$\Delta G^{\circ} = \frac{-2 \times 96487 \times 1.1}{1000}$

$\Delta G^{\circ} = -212.27\ kJ\ mol^{-1}$

95. If both assertion and reason are true but reason is not the correct explanation of assertion.

यदि कथन तथा कारण दोनो सही हैं लेकिन कारण कथन की सही व्याख्या नहीं करता है।

96. Hydrogenation

हाइड्रोजनीकरण द्वारा

97. He_2^+ bond order = $\frac{2-1}{2} = \frac{1}{2}$; O_2^- bond order = $\frac{10-7}{2} = 1.5$

C_2 bond order = $\frac{8-4}{2} = 2$; NO bond order = $\frac{10-5}{2} = 2.5$

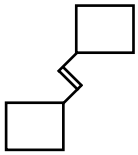
Bond order $\propto$ bond dissociation energy.

He_2^+ बन्ध क्रम = $\frac{2-1}{2} = \frac{1}{2}$; O_2^- बन्ध क्रम = $\frac{10-7}{2} = 1.5$

C_2 बन्ध क्रम = $\frac{8-4}{2} = 2$; NO बन्ध क्रम = $\frac{10-5}{2} = 2.5$

बन्ध क्रम $\propto$ बन्ध वियोजन ऊर्जा

98.



99. Both statements are true but **Reason** is not the true explanetion of **Assertion**. As in these species the central atoms have more than an octet of electrons i.e., expanded octet)

दोनों कथन सही है लेकिन **कथन, कारण** की सही व्याख्या नहीं करता है। किसी भी स्पीशीज में केन्द्रिय परमाणु में इलेक्ट्रॉन की संख्या 8 से ज्यादा है।

100. S_N2 reaction involves transition state, there is no intermediate.

S_N2 अभिक्रिया संक्रमण अवस्था द्वारा सम्पन्न होती है, इसमें कोई मध्यवर्ती नहीं बनता है।

---- TEXT SOLUTIONS (TS) END ----

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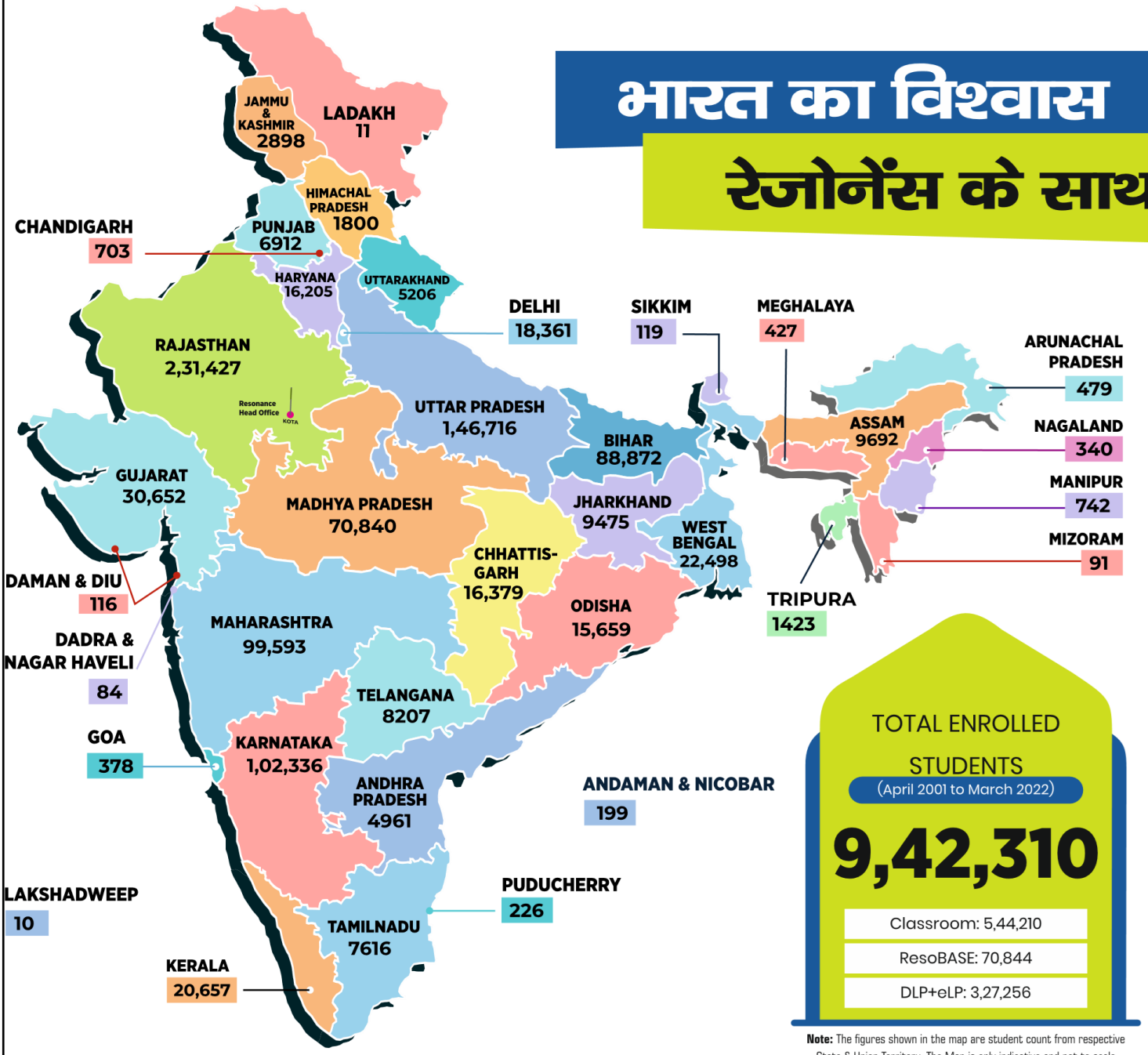

TOTAL ENROLLED STUDENTS
(April 2001 to March 2022)

9,42,310

- Classroom: 5,44,210
- ResoBASE: 70,844
- DLP+eLP: 3,27,256

Note: The figures shown in the map are student count from respective State & Union Territory. The Map is only indicative and not to scale

Resonance : The Legacy of 21 Years (2001-2022) of Academic Excellence

- **JEE (Adv.) / IIT-JEE** ▸ **50 हजार +** SELECTIONS SINCE 2002
  229 AIRs in TOP-100 (Classroom + DLP)
- **JEE (Main) / AIEEE** ▸ **2.40 लाख+** SELECTIONS SINCE 2009
  136 AIRs in TOP-100 (Classroom + DLP)
- **NEET (UG) / AIPMT** ▸ **19 हजार+** SELECTIONS SINCE 2012
  19 AIRs in TOP-100 (Classroom + DLP)

- **NTSE** SINCE 2006 ▸ **2440** Scholars
- **KVPY** SINCE 2006 ▸ **2859** Fellowship Winners
- **OLYMPIADS** SINCE 2006 ▸ **52** Medalists (Gold/Silver/ Bronze) in International Olympiads
- **CA & CS** SINCE 2013 ▸ **4179** Selections — 5 Times AIR-1 in CA & CS Exams
- **CLAT, SET & GPTU** SINCE 2014 ▸ **77** Selections — AIR-1 in GPTU