

PERIODIC ASSESSMENT TEST (PAT)

STUDENT SUPPORT BOOKLET (SSB)

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

CLASS	XII	COURSE NAME	SANKALP	COURSE CODE	MP
PHASE CODE(S)	MP, MPH	TOTAL PAGES	20	BATCH CODE(S)	MP, MPH

Target Examination & Year:

NEET 2024

TEST PATTERN	TEST TYPE	TEST CODE & SEQUENCE
NEET	ALL INDIA RESONANCE TEST (AIRT)	AIRT 01



DATE & DAY:

29th October 2023 | Sunday



Duration & Time:

200 Minutes | 02:30 PM to 05:50 PM

Contents:

- ▶ Weightage Sheet (WS)
- ▶ Answer Key (AK)
- ▶ Standard Hints (SH)
- ▶ Text Solutions (TS)
- ▶ Resonance Student's Critical Analysis of Learning for Excellence (ResoSCALE)
- ▶ Student Self Assessment Sheet (SAS)
- ▶ Video Solutions (VS)

Scan QR Code for
Video Solutions



Resonance Eduventures Ltd.

Kota Study Centre & Registered Corporate Office:

CG Tower, A-46 & 52, IPIA, Near City Mall, Jhalawar Road, Kota (Raj.) - 324005

Tel. No.: 0744-2777777, 2777700 | CIN: U80302RJ2007PLC024029 | www.resonance.ac.in



**APPLY
ONLINE**



7340010345



www.youtube.com/ResonanceEduventuresOfficial

PAT : TOPIC-WISE WEIGHTAGE SHEET

	PAPER	Total		PAPER	Total
Total Qs	200	200	Subject wise Qs.	50	200
Max. Marks	720	720	Subject wise Marks	240	720

Chemistry										
S.No.	Topic Name	Question Type & Sequencing						Total Qs. (Topic-wise)	Total Marks (Topic-wise)	% Weightage (Topic-wise)
		MCQ		ARQ		MTCQ				
		No. of Qs.	Qs. Sequencing	No. of Qs.	Qs. Sequencing	No. of Qs.	Qs. Sequencing			
Physical Chemistry										
	Class-11	14						14	56	28.00%
1	Mole Concept	3	1,8,16	-	-	-	-	3	12	6.00%
2	Chemical Equilibrium	3	2,10,39	-	-	-	-	3	12	6.00%
3	Atomic Structure	2	6,37	-	-	-	-	2	8	4.00%
4	Thermodynamics	3	11,12,42	-	-	-	-	3	12	6.00%
5	Redox Reaction	1	13	-	-	-	-	1	4	2.00%
6	Ionic Equilibrium	2	19,40	-	-	-	-	2	8	4.00%
	Class-12	7						7	28	14.00%
7	Solution Colligative Properties	2	7,18	-	-	-	-	2	8	4.00%
8	Electrochemistry	4	9,15,43,45	-	-	-	-	4	16	8.00%
9	Chemical Kinetics	1	44	-	-	-	-	1	4	2.00%

Inorganic Chemistry										
	Class-11	3				1		4	16	8.00%
10	Periodic Table	2	3,41	-	-	-	-	2	8	4.00%
11	P-Block Element (B and C)	1	17	-	-	-	-	1	4	2.00%
12	Chemical Bonding	-	-	-	-	1	20	1	4	2.00%
	Class-12	4		1				5	20	10.00%
13	P-Block (Nitrogen and Oxygen)	1	5	1	4	-	-	2	8	4.00%
14	Coordination Compound	3	14,36,38	-	-	-	-	3	12	6.00%
Organic Chemistry										
	Class-11	5		2				7	28	14.00%
15	IUPAC nomenclature	1	21	2	32,48	-	-	3	12	6.00%
16	General Organic Chemistry	2	23,46	-	-	-	-	2	8	4.00%
17	Hydrocarbon part-I	2	24,47	-	-	-	-	2	8	4.00%
	Class-12	12				1		13	52	26.00%
18	Stereoisomerism	1	22	-	-	-	-	1	4	2.00%
19	Carboxylic acid and Derivatives	3	25,29,33	-	-	-	-	3	12	6.00%
20	Aromatic Compound	3	26,31,35	-	-	-	-	3	12	6.00%
21	Girgnard Reagent	1	27	-	-	1	49	2	8	4.00%
22	Reaction Mechanism	3	28,30,34	-	-	-	-	3	12	6.00%
23	Practical Organic Chemistry	1	50	-	-	-	-	1	4	2.00%
Total		45		3		2		50	200	100%

PAT : TOPIC-WISE WEIGHTAGE SHEET
Physics

S.No.	Topic Name	Question Type & Sequencing						Total Qs. (Topic-wise)	Total Marks (Topic-wise)	% Weightage (Topic-wise)
		MCQ		ARQ		MTCQ				
		No. of Qs.	Qs. Sequencing	No. of Qs.	Qs. Sequencing	No. of Qs.	Qs. Sequencing			
	Class-11	22						22	88	44.00%
1	Unit and Dimension	1	51	–	–	–	–	1	4	2.00%
2	Measurement Error	1	54	–	–	–	–	1	4	2.00%
3	Rectilinear motion	1	56	–	–	–	–	1	4	2.00%
4	Projectile motion	1	58	–	–	–	–	1	4	2.00%
5	Relative motion	2	59,60	–	–	–	–	2	8	4.00%
6	Newton's laws of motion	1	62	–	–	–	–	1	4	2.00%
7	Friction	1	63	–	–	–	–	1	4	2.00%
8	Work, Power, Energy	3	65,66,69	–	–	–	–	3	12	6.00%
9	Rigid body dynamics	1	67	–	–	–	–	1	4	2.00%
10	Centre of mass	2	71,72	–	–	–	–	2	8	4.00%
11	KTG and Thermodynamics	1	73	–	–	–	–	1	4	2.00%
12	Simple Harmonic motion	1	74	–	–	–	–	1	4	2.00%
13	Sound Wave	2	75,76	–	–	–	–	2	8	4.00%
14	Elasticity and viscosity	1	77	–	–	–	–	1	4	2.00%
15	Surface Tension	2	78,79	–	–	–	–	2	8	4.00%
16	Fluid mechanics	1	80	–	–	–	–	1	4	2.00%
	Class-12	26		1		1		28	112	56.00%
17	Heat Transfer	1	52	–	–	–	–	1	4	2.00%
18	Capacitance	3	53,55,57	–	–	–	–	3	12	6.00%
19	Alternating Current	3	61,64,68	–	–	–	–	3	12	6.00%
20	Electro Magnetic Field	3	70,86,87	–	–	–	–	3	12	6.00%
21	Geometrical Optics	5	81,82,83,84,85	–	–	–	–	5	20	10.00%
22	Electro Magnetic Induction	3	88,89,90	–	–	–	–	3	12	6.00%
23	Solid and Semiconductor	2	91,92	–	–	–	–	2	8	4.00%
24	Modern Physics	3	93,94,95	–	–	–	–	3	12	6.00%
25	Nuclear Physics	2	96,97	–	–	–	–	2	8	4.00%
26	Electromagnetic waves	1	98	–	–	–	–	1	4	2.00%
27	Electrostatics	–	–	1	99	1	100	2	8	4.00%
	Total	48		1		1		50	200	100%

PAT : TOPIC-WISE WEIGHTAGE SHEET

Botany								
S.No.	Topic Name	Question Type & Sequencing				Total Qs. (Topic-wise)	Total Marks (Topic-wise)	% Weightage (Topic-wise)
		MCQ		ARQ				
		No. of Qs.	Qs. Sequencing	No. of Qs.	Qs. Sequencing			
	Class-12	16				16	64	32.00%
1	Genetics-I	5	101,102,123, 141,142	–	–	5	20	10.00%
2	Sexual Reproduction in Flowering Plants	4	103,104,133, 144	–	–	4	16	8.00%
3	Ecology-Organisms and Population	5	105,111,116, 136,143	–	–	5	20	10.00%
4	Genetics-II	2	106,112	–	–	2	8	4.00%
	Class-11	33		1		34	136	68.00%
5	Plant Physiology-II- Respiration in plants	2	107,137	–	–	2	8	4.00%
6	Plant Physiology-II- Photosynthesis In Higher Plants	3	108,130,138	–	–	3	12	6.00%
7	The Living World	1	109	–	–	1	4	2.00%
8	Cell Biology	5	110,117,125, 132,145	–	–	5	20	10.00%
9	Plant Physiology-I- Mineral Nutrition	2	113,139	–	–	2	8	4.00%
10	Plant Physiology-I- Transport in plants	3	114,131,146	1	140	4	16	8.00%
11	Plant Physiology-II- Plant growth and Growth Hormones	2	115,124	–	–	2	8	4.00%
12	Morphology of Flowering Plants	2	118,150	–	–	2	8	4.00%
13	Anatomy of Flowering Plants	4	119,126,134, 147	–	–	4	16	8.00%
14	Plant Kingdom	4	120,121,127, 149	–	–	4	16	8.00%
15	Biological Classification	5	122,128,129, 135,148	–	–	5	20	10.00%
	Total	49		1		50	200	100%

PAT : TOPIC-WISE WEIGHTAGE SHEET

Zoology										
S.No.	Topic Name	Question Type & Sequencing						Total Qs. (Topic-wise)	Total Marks (Topic-wise)	% Weightage (Topic-wise)
		MCQ		MTCQ		ARQ				
		No. of Qs.	Qs. Sequencing	No. of Qs.	Qs. Sequencing	No. of Qs.	Qs. Sequencing			
	Class-12	18		2		2		22	88	44.00%
1	Human Reproduction and Reproductive Health	5	151,152,155,168,199	2	153,154	1	200	8	32	16.00%
2	Application Biology (Biotechnology)	6	156,157,158,159,160,161	–	–	1	198	7	28	14.00%
3	Origin and Evolution	3	162,163,164	–	–	–	–	3	12	6.00%
4	Biology In Human Welfare-Human Health and Disease	3	165,166,167	–	–	–	–	3	12	6.00%
5	Biology In Human Welfare-Microbes in human Welfare	1	197	–	–	–	–	1	4	2.00%
	Class-11	17		1		10		28	112	56.00%
6	Biomolecule-I	3	169,170,171	–	–	1	196	4	16	8.00%
7	Structural organisation in animals	2	172,173	1	195	–	–	3	12	6.00%
8	Locomotion and Movement	1	174	–	–	2	193,194	3	12	6.00%
9	Breathing and Exchange of Gases	3	175,176,177	–	–	–	–	3	12	6.00%
10	Body fluids and circulation	2	178,179	–	–	1	192	3	12	6.00%
11	Excretory Product and Their Elimination	3	180,181,182	–	–	–	–	3	12	6.00%
12	Neural Control and Coordination	1	183	–	–	2	190,191	3	12	6.00%
13	Chemical Coordination and Integration	1	184	–	–	2	186,187	3	12	6.00%
14	Animal Kingdom-1	1	185	–	–	2	188,189	3	12	6.00%
	Total	35		3		12		50	200	100%

ANSWER KEY (AK)

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

STUDENT'S SPACE

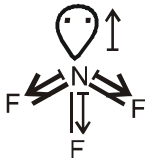
TEXT SOLUTIONS (TS)

PAPER

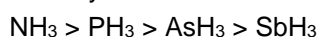
PART-A: CHEMISTRY

1. All
2. Concentration of reactant & product remains const. w.r.t time.
And, rate of [AT EQUILIBRIUM] forward reaction (r_f) = rate of backward reaction.

3. Half-filled electron configuration has extra stability. Hence the removal of electron from outer most orbit requires higher energy.

4.  Bond dipoles of N—F bonds are counter balanced to some extent by the dipole moment of lone pair of electron acting in opposite direction. This reduces both the dipole moment and its donor powers.

5. Has one lone pair of electrons on central atom which they can donate to lewis acid and the order of basicity is :



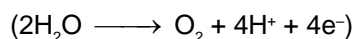
6.
$$E = \frac{hc}{\lambda} = \frac{6.63 \times 10^{-34} \times 3 \times 10^8}{45 \times 10^{-9}} = 4.4 \times 10^{-18}$$

7. $\Delta T_f = i K_f m$
Greater the i value lower will be freezing point

8. For the reaction,
 $\text{C}_3\text{H}_8(\text{g}) + 5\text{O}_2(\text{g}) \longrightarrow 3\text{CO}_2(\text{g}) + 4\text{H}_2\text{O}(\ell)$
 Δn = number of gaseous moles of products
– number of gaseous moles of reactants
 $= 3 - 6 = -3$
 $\therefore \Delta H = \Delta E + \Delta nRT$
or $\Delta H - \Delta E = \Delta nRT$
 $\therefore \Delta H - \Delta E = -3RT$

9.
$$n_{\text{O}_2} = \frac{5600}{22400} = \frac{1}{4}$$

$$\frac{w_{\text{Ag}}}{108} \times 1 = \frac{w_{\text{O}_2}}{M_{\text{O}_2}} \times 4$$



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

$$w_{\text{Ag}} = 108 \text{ g}$$

10. According to Le-Chatelier principle.

11.
$$\Delta H = \Delta U + \Delta n_g RT$$

$$= 2.1 + \frac{2 \times 2 \times 300}{1000} = 1.2$$

$$\Delta G = \Delta H - T\Delta S$$

$$= 3.3 - 300 \times \frac{26}{1000} = 3.3 - 6 = -2.7 \text{ K cal}$$

12. For the reaction
 $\text{H}_2(\text{g}) + \text{Br}_2(\text{g}) \longrightarrow 2\text{HBr}(\text{g})$ $\Delta H^\circ = ?$
 $\Delta H^\circ = - [(2 \times \text{bond energy of HBr}) - (\text{bond energy of H}_2 + \text{bond energy of Cl}_2)]$
 $\Delta H^\circ = - [(2 \times (364)) - (433 + 192)] \text{ kJ}$
 $= - [728 - (625)] \text{ kJ}$

13. Equivalent wt of acid
$$= \frac{\text{molecular wt.}}{\text{No. of H}^+ \text{ replaced per acid molecule}}$$

$$\text{Equivalent wt.} = \frac{98}{1} = 1$$

14. $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$
 $\text{Fe}^{+2} = 3d^5 (t_{2g}^{1,1,1} e_g^{1,1})$
so C.F.S.E. is $[-0.4 \times 3 + 0.6 \times 2] \Delta_0 = 0$

15. $2\text{H}^+(\text{aq}) + 2\text{e}^- \longrightarrow \text{H}_2$ (reduction reaction)

$$E = E^\circ - \frac{0.059}{2} \log \frac{P_{\text{H}_2}}{[\text{H}^+(\text{aq})]^2}$$

$$0 = 0 - \frac{0.059}{2} \log \frac{P_{\text{H}_2}}{[10^{-7}]^2}$$

(In order to make $\log 1 = 0$)

$$P_{\text{H}_2} = (10^{-7})^2$$

$$= 10^{-14} \text{ atm}$$

16. $3.4 = \frac{32 \times 1}{M_w} \times 100 \Rightarrow x = \frac{3200}{3.4} = 941.176$

17. As oxidation number of central atom increases, acidic nature increases.
 $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$

18. At B.P. $P_0 = 760$ torr
 for elevation of B.P.

$$\frac{P^0 - P_s}{P_s} = \frac{W_A / M_A}{W_B / M_B}$$

$$\Delta T_B = I K_{bm} = 1 \times 0.52 \times \frac{\left(\frac{6.5}{32}\right)}{100} \times 1000 = 1$$

$$\frac{760 - 732}{732} = \frac{6.5/M}{100/18}$$

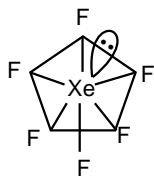
$$= 1$$

On solving $M = 32$.

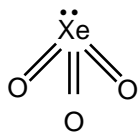
$$\text{So B.P.} = 100 + \Delta T_B = 101^\circ\text{C}$$

19. $\text{pH} = \frac{1}{2} [\text{p}K_w + \text{p}K_a + \log_{10} C] = \frac{1}{2} [14 + 5 - \log 2 + \log_{10} 10^{-2}] = 8.35$

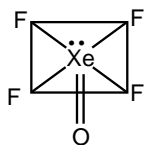
20. $\text{XeF}_6 \longrightarrow \text{sp}^3\text{d}^3 \longrightarrow$ distorted octahedral विकृत अष्टफलकीय



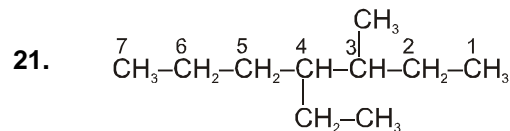
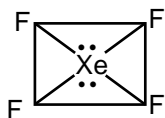
$\text{XeO}_3 \longrightarrow \text{sp}^3 \longrightarrow$ pyramidal पिरामिडीय



$\text{XeF}_4 \longrightarrow \text{sp}^3\text{d}^2 \longrightarrow$ square pyramidal वर्ग पिरामिडीय

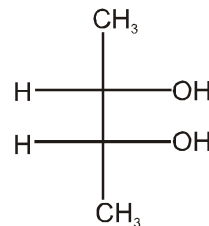


$\text{XeF}_4 \longrightarrow \text{sp}^3\text{d}^2 \longrightarrow$ square planar वर्ग समतलीय



Correct IUPAC name is 4-Ethyl-3-methylheptane

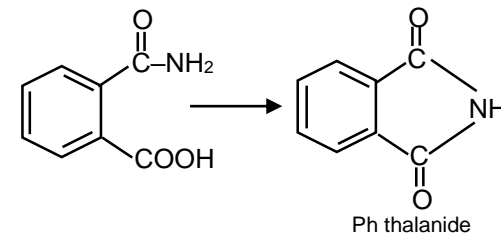
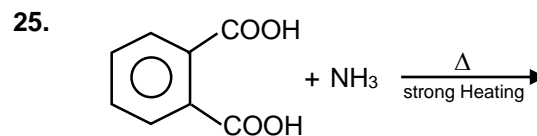
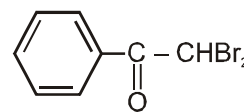
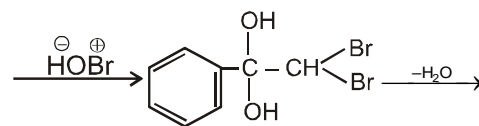
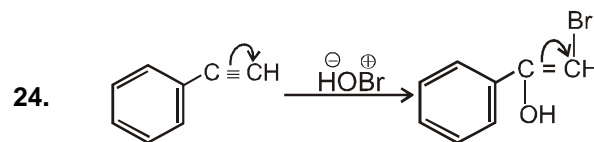
(4-एथिल-3-मेथिलहेप्टेन, सही IUPAC नाम है)

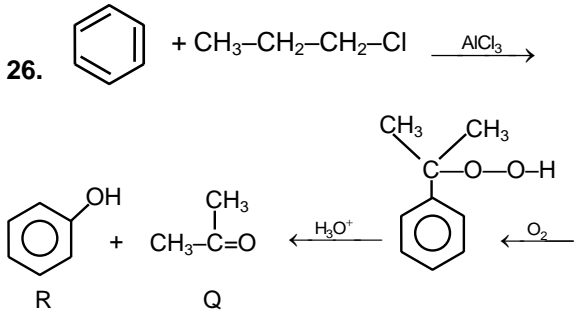


22. meso form

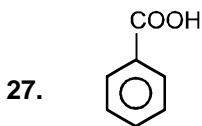
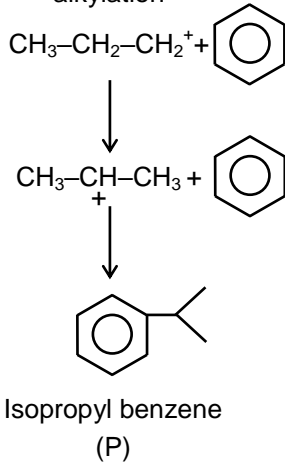
23. Due to +M effect of -OH group and hyperconjugation of -CH₃ group

-OH समूह के +M प्रभाव और -CH₃ समूह के अतिसंयुग्मन प्रभाव के कारण।

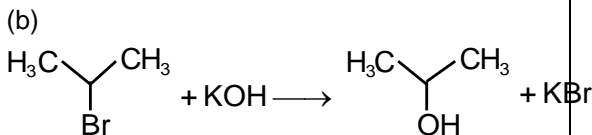




This is Friedal craft alkylation

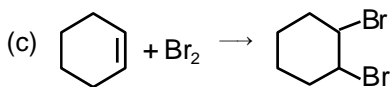


28. (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br} + \text{KOH} \rightarrow \text{CH}_3\text{CH}=\text{CH}_2 + \text{KBr} + \text{H}_2\text{O}$ \rightarrow Elimination reaction
Formation of π -bond and conversion of saturated compound into unsaturated compound by the removal of groups or atoms is known as Elimination reaction



\rightarrow Substitution Reaction

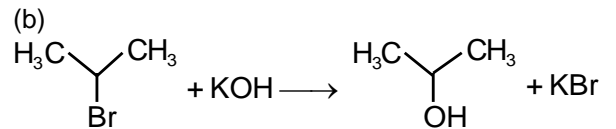
Replacement of one group by other group known as Substitution Reaction



\rightarrow addition reaction

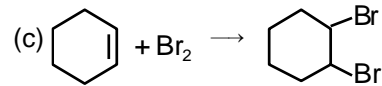
Conversion of unsaturated compound into saturated compound by the addition of groups or atoms is called as addition reaction.

(a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br} + \text{KOH} \rightarrow \text{CH}_3\text{CH}=\text{CH}_2 + \text{KBr} + \text{H}_2\text{O}$ \rightarrow विलोपन अभिक्रिया
 π -बंध का निर्माण तथा परमाणु या समूहों के हटने पर संतृप्त यौगिक का असंतृप्त यौगिक में रूपान्तरण को विलोपन अभिक्रिया कहते हैं।



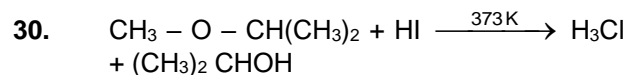
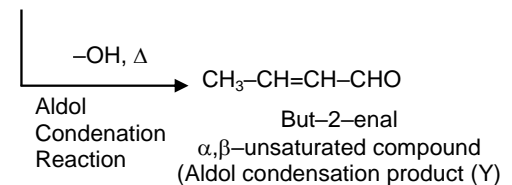
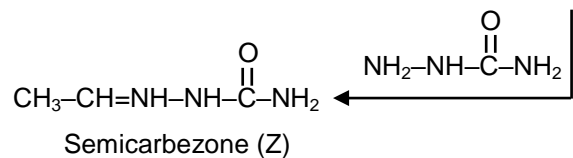
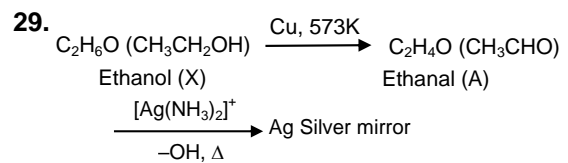
\rightarrow प्रतिस्थापन अभिक्रिया

किसी समूह का दूसरे समूह द्वारा प्रतिस्थापन होने पर उसे प्रतिस्थापन अभिक्रिया कहते हैं।

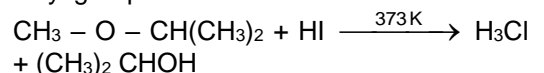


\rightarrow योगज अभिक्रिया

परमाणु या समूहों के जुड़ने पर असंतृप्त यौगिक के संतृप्त यौगिक में रूपान्तरण को योगज अभिक्रिया कहते हैं।



In case of unsymmetrical ether, the alkyl halide is always formed from smaller alkyl group. This happens so, because I⁻ ion being larger in size approaches smaller alkyl group to avoid steric hindrance.

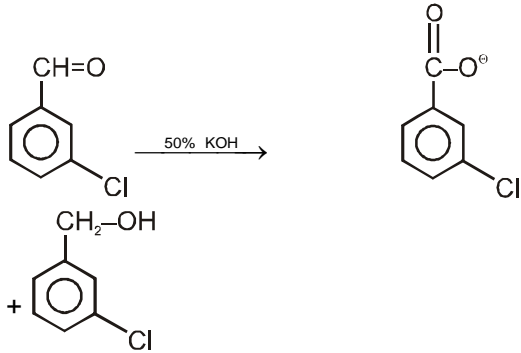


असममित ईथर में एल्किन हैलाइड सदैव छोटे एल्किल समूह द्वारा प्राप्त होता है। ऐसा इसलिए है क्योंकि I⁻ आकार में बड़ा होने के कारण छोटे एल्किल समूह से जुड़ता है ताकि त्रिविम बाधा से बचा जा सके।

31. H_3PO_2 and H_2O reduces the $-\overset{+}{\text{N}}_2\overset{-}{\text{Cl}}$ to $-\text{H}$
 H_3PO_2 तथा H_2O , $-\overset{+}{\text{N}}_2\overset{-}{\text{Cl}}$ को $-\text{H}$ में अपचयित करता है।

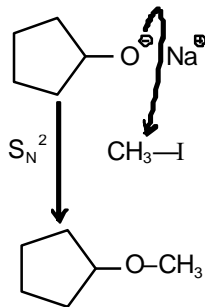
32. If both assertion and reason are false.
 यदि कथन तथा कारण दोनों गलत हैं।

33. Cannizzaro reaction (कैनिजरो अभिक्रिया)



34.

acid-base Reaction



This williamson ether synthesis

35. Nitrobenzene is strongly deactivated, hence will not undergo Friedal-craft's reaction.

नाइट्रोबेन्जीन प्रबल विसक्रियकारी है अतः यह फ्रीडेल-क्राफ्ट्स अभिक्रिया प्रदर्शित नहीं करेगा।

36. $\text{Fe} \rightleftharpoons \text{C} \equiv \text{O}$

Due to back bonding between metal-carbon bond length of $\text{C}-\text{O}$ increase (B.O of $\text{M}-\text{C} \uparrow$ B.O of $\text{C}-\text{C} \downarrow$ B.L. of $\text{C}-\text{O} \uparrow$) Higher is negative charge on metal, higher is back bonding (synergic effect) so bond length is higher so answer is $[\text{Fe}(\text{CO})_4]^{2-}$

$\text{Fe} \rightleftharpoons \text{C} \equiv \text{O}$

पश्च आबन्धन के कारण धातु कार्बन बन्ध लम्बाई बढ़ती है (B.O of $\text{M}-\text{C} \uparrow$ B.O of $\text{C}-\text{C} \downarrow$ B.L. of $\text{C}-\text{O} \uparrow$) धातु पर जितना अधिक ऋणावेश होगा उतना अधिक पश्च आबन्धन होगा। इसलिए बन्ध लम्बाई भी अधिक होगी।

$$37. R = 0.529 \frac{n^2}{Z} \text{ \AA}$$

$$= 0.529 \frac{2^2}{1} \text{ \AA}$$

$$= 2.12 \text{ \AA}$$

38. Ionization isomerism arises due to the exchange of ligand(s) between ionization sphere and ionic sphere.

आयनन गोलक तथा आयनिक गोलक के मध्य लिगेन्डों के विनिमय के कारण आयनन समावयवता प्राप्त होती है।

39. At equilibrium $\Delta G = 0$

$$\text{Given } \Delta G^0 = -2.303RT \log K$$

$$= -2.303RT$$

$$\text{so } \log K = 1 \text{ and } K = 10$$

$$40. \text{pOH} = \text{pK}_b + \log \frac{[\text{Salt}]}{[\text{Base}]}$$

$$= \text{pK}_b + \log \frac{[\text{Cation}]}{[\text{Base}]}$$

$$[\text{NH}_4^+] = 2 \times \text{mole of } (\text{NH}_4)_2\text{SO}_4$$

$$\therefore \text{pOH} = 5 + \log 2 = 5.3$$

$$\text{or } \text{pH} = 8.7$$

$$\text{pOH} = \text{pK}_b + \log \frac{[\text{लवण}]}{[\text{क्षार}]}$$

$$= \text{pK}_b + \log \frac{[\text{धनायन}]}{[\text{क्षार}]}$$

$$[\text{NH}_4^+] = 2 \times (\text{NH}_4)_2\text{SO}_4 \text{ के मोल}$$

$$\therefore \text{pOH} = 5 + \log 2 = 5.3$$

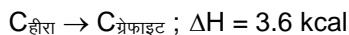
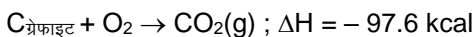
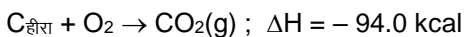
$$\text{या } \text{pH} = 8.7$$

41. Always endothermic

सदैव ऊष्माशोषी

42. $C_{\text{Diamond}} + O_2 \rightarrow CO_2(g)$; $\Delta H = -94.0 \text{ kcal}$
 $C_{\text{Graphite}} + O_2 \rightarrow CO_2(g)$; $\Delta H = -97.6 \text{ kcal}$
 $C_{\text{Diamond}} \rightarrow C_{\text{Graphite}} \Delta H = 3.6 \text{ kcal}$
Heat required to convert 12 gram diamond to graphite = 3.6

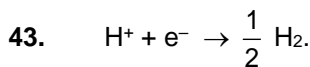
\therefore Heat required to convert 1 gm diamond to graphite = $\frac{3.6}{12} = 0.3$



12 ग्राम हीरे को ग्रेफाइट में परिवर्तित करने के लिए आवश्यक ऊष्मा = 3.6

\therefore 1 ग्राम हीरे को ग्रेफाइट में परिवर्तित

करने के लिए आवश्यक ऊष्मा = $\frac{3.6}{12} = 0.3$



$$E = 0 - \frac{.0591}{1} \log_{10} \frac{1}{[H^+]}$$

$$= + 0.591 \log_{10}[H^+].$$

$$E_1 = 0 \text{ \{pH = 0\}.}$$

$$E_2 = + 0.0591 \log_{10}[10^{-7}]$$

$$= - .0591 \times 7 \text{ \{at pH = 7\} = - 0.41 V.}$$

44. Rate ; $k[A]^n$

$$\frac{\text{mole}}{\text{Lit} \times \text{Sec}} = k \left[\frac{\text{mole}}{\text{Lit}} \right]^n \Rightarrow \text{Unit of } k = (\text{mole})^{1-n}$$

$$L^{-1} S^{-1}$$

45. $K = \frac{1}{R} \times \frac{\ell}{A} = \left(\left(\frac{1}{1500} \right) \times 1.14 \right) S \text{ cm}^{-1}$

$$\Rightarrow \wedge_m = 1000 \times \frac{(1.14)}{0.001} S \text{ cm}^2 \text{ mol}^{-1}$$

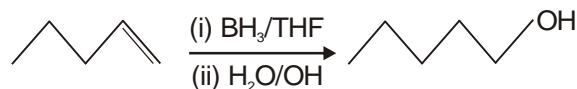
$$= 760 S \text{ cm}^2 \text{ mol}^{-1} \Rightarrow 760$$

46. Benzyl amine

बेन्जिल एमीन

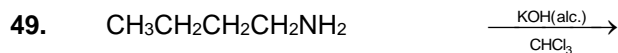
47. Hydroboration - oxidation leads to anti-Markownikoff's hydration, thus

हाइड्रोबोरीकरण-ऑक्सीकरण, ऐन्टी मारकोनीकॉफ जलयोजन के कारण होता है, अतः



48. If both assertion and reason are true and reason is the correct explanation of assertion.

यदि कथन तथा कारण दोनों सही हैं तथा कारण कथन की सही व्याख्या करता है।



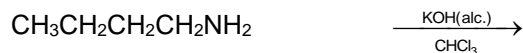
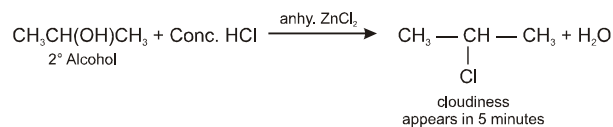
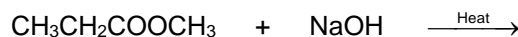
1° Amine

Bad

smell of isocyanide

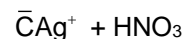
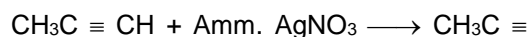


White ppt.

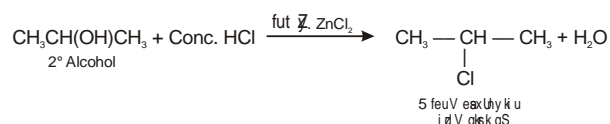
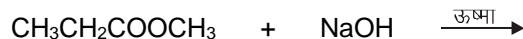


1°, ऐमीन

आइसोसायनाइड की दुर्गन्ध



श्वेत आवक्षेप



50. Prussian blue colour of $Fe_4[Fe(CN)_6]_3$ will appear.

PART-B: PHYSICS

51. Stefan's law is $E = \sigma(T^4) \Rightarrow \sigma = \frac{E}{T^4}$

where, $E = \frac{\text{Energy}}{\text{Area} \times \text{Time}} = \frac{\text{Watt}}{\text{m}^2}$

$$\sigma = \frac{\text{Watt} \cdot \text{m}^{-2}}{\text{K}^4} = \text{Watt} \cdot \text{m}^{-2} \text{K}^{-4}$$

स्टीफन के नियम से $E = \sigma(T^4) \Rightarrow \sigma = \frac{E}{T^4}$

यहाँ, $E = \frac{\text{ऊर्जा}}{\text{क्षेत्रफल} \times \text{सम}} = \frac{\text{वाट}}{\text{मीटर}^2}$

$$\sigma = \frac{\text{Watt} \cdot \text{m}^{-2}}{\text{K}^4} = \text{Watt} \cdot \text{m}^{-2} \text{K}^{-4}$$

52. $\frac{Q}{t} = \frac{KA\Delta\theta}{l} \Rightarrow \frac{Q}{t} \propto \frac{A}{l} \propto \frac{d^2}{l}$ (d = Diameter of rod)

$$\Rightarrow \frac{(Q/t)_1}{(Q/t)_2} = \left(\frac{d_1}{d_2}\right)^2 \times \frac{l_2}{l_1} = \left(\frac{1}{2}\right)^2 \times \left(\frac{1}{2}\right) = \frac{1}{8}$$

$\frac{Q}{t} = \frac{KA\Delta\theta}{l} \Rightarrow \frac{Q}{t} \propto \frac{A}{l} \propto \frac{d^2}{l}$ (d = छड़ का व्यास)

$$\Rightarrow \frac{(Q/t)_1}{(Q/t)_2} = \left(\frac{d_1}{d_2}\right)^2 \times \frac{l_2}{l_1} = \left(\frac{1}{2}\right)^2 \times \left(\frac{1}{2}\right) = \frac{1}{8}$$

53. Extra charge $Q = (2CV - CV) = CV$ flows through potential V of the battery. Thus $W = QV = CV^2$
अतिरिक्त आवेश $Q = (2CV - CV) = CV$ बैटरी (विभव V) से

प्रवाहित होगा अतः $W = QV = CV^2$

54. zero error शून्य त्रुटि = $-2 \text{ mm} + (6 \times 0.1) \text{ mm} = -1.4 \text{ mm}$
measured thickness मापी गई मोटाई = $7 \text{ mm} + (3 \times 0.1) \text{ mm} = 7.3 \text{ mm}$
True thickness वास्तविक मोटाई = $7.3 \text{ mm} + 1.4 \text{ mm} = 8.7 \text{ mm}$

55. If the drops are conducting, then $\frac{4}{3}\pi R^3 = N\left(\frac{4}{3}\pi r^3\right) \Rightarrow R = N^{1/3}r$. Final charge

$$Q = Nq$$

So final potential $V = \frac{Q}{R} = \frac{Nq}{N^{1/3}r} = V \times N^{2/3}$

यदि बूंदें चालक हैं, तब

$$\frac{4}{3}\pi R^3 = N\left(\frac{4}{3}\pi r^3\right) \Rightarrow R = N^{1/3}r \text{ अंतिम आवेश } Q = Nq$$

अतः अंतिम विभव $V = \frac{Q}{R} = \frac{Nq}{N^{1/3}r} = V \times N^{2/3}$

56. From given figure, it is clear that the net displacement is zero. So average velocity will be zero.

दिये गये चित्र से यह स्पष्ट है, कि वस्तु का कुल विस्थापन शून्य है, इसलिये औसत वेग शून्य होगा।

57. No current flows through the capacitor branch in steady state. Total current supplied by the battery

$$i = \frac{6}{2.8 + 1.2} = \frac{3}{2}$$

Current through 2Ω resistor $= \frac{3}{2} \times \frac{3}{5} = 0.9 \text{ A}$

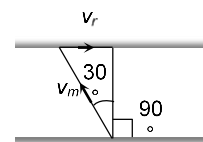
स्थायी अवस्था में, संधारित्र से कोई धारा प्रवाहित नहीं होगी। बैटरी द्वारा प्रदाय कुल धारा

$$i = \frac{6}{2.8 + 1.2} = \frac{3}{2}$$

2Ω प्रतिरोध से प्रवाहित धारा = $\frac{3}{2} \times \frac{3}{5} = 0.9 \text{ A}$

58. $R = 4H \cot \theta$, if $\theta = 45^\circ$ then $R = 4H \Rightarrow$

$$\frac{R}{H} = \frac{4}{1}$$



59.

$$\sin 30^\circ = \frac{v_r}{v_m} = \frac{1}{2} \Rightarrow v_r = \frac{v_m}{2} = \frac{0.5}{2} = 0.25 \text{ m/s}$$

60. As we know, for conductors resistance \propto Temperature.

From figure $R_1 \propto T_1 \Rightarrow \tan\theta \propto T_1 \Rightarrow \tan\theta = kT_1$... (i)

and $R_2 \propto T_2 \Rightarrow \tan(90^\circ - \theta) \propto T_2 \Rightarrow \cot\theta = kT_2$ (ii)

From equation (i) and (ii)

$$k(T_2 - T_1) = (\cot\theta - \tan\theta)$$

$$(T_2 - T_1) = \left(\frac{\cos\theta}{\sin\theta} - \frac{\sin\theta}{\cos\theta} \right) = \frac{(\cos^2\theta - \sin^2\theta)}{\sin\theta\cos\theta}$$

$$= 2\cot 2\theta$$

$$\Rightarrow (T_2 - T_1) \propto \cot 2\theta$$

चालक का प्रतिरोध \propto तापक्रम

चित्र से, $R_1 \propto T_1 \Rightarrow \tan\theta \propto T_1 \Rightarrow \tan\theta = kT_1$... (i)

एवं $R_2 \propto T_2 \Rightarrow \tan(90^\circ - \theta) \propto T_2 \Rightarrow \cot\theta = kT_2$... (ii)

समीकरण (i) व (ii) से, $k(T_2 - T_1) = (\cot\theta - \tan\theta)$

$$(T_2 - T_1) = \left(\frac{\cos\theta}{\sin\theta} - \frac{\sin\theta}{\cos\theta} \right) = \frac{(\cos^2\theta - \sin^2\theta)}{\sin\theta\cos\theta}$$

$$= 2\cot 2\theta$$

$$\Rightarrow (T_2 - T_1) \propto \cot 2\theta$$

61. $i_{r.m.s.} = \frac{i_0}{\sqrt{2}} = \frac{4}{\sqrt{2}} = 2\sqrt{2}$ ऐम्पियर

$$i_{r.m.s.} = \frac{i_0}{\sqrt{2}} = \frac{4}{\sqrt{2}} = 2\sqrt{2} \text{ ampere}$$

62. Opposing force $F = u \left(\frac{dm}{dt} \right) = 2 \times 0.5 = 1 \text{ N}$

$$\left(\text{As, } F = u \frac{du}{dt} \right)$$

So same amount of force is required to keep the belt moving at 2 m/s

प्रतिरोधक बल $F = u \left(\frac{dm}{dt} \right) = 2 \times 0.5 = 1 \text{ N}$

$$\left(\because F = u \frac{du}{dt} \right)$$

अतः बेल्ट को 2 m/s की चाल से गतिशील रखने के लिये इतने ही बल की आवश्यकता होगी।

63. Sliding friction is greater than rolling friction.

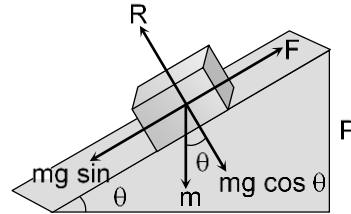
सर्पी घर्षण का मान लोटनिक घर्षण से अधिक होता है।

64.

$$P = V_{r.m.s.} \times i_{r.m.s.} \times \cos\phi$$

$$= \frac{100}{\sqrt{2}} \times \frac{100 \times 10^{-3}}{\sqrt{2}} \times \cos\frac{\pi}{3}$$

$$= \frac{10^4 \times 10^{-3}}{2} \times \frac{1}{2} = \frac{10}{4} = 2.5 \text{ watt}$$



65.

$$v = 7.2 \frac{\text{km}}{\text{h}} = 7.2 \times \frac{5}{18} = 2 \text{ m/s}$$

Slope is given 1 in 20

$$\therefore \sin\theta = \frac{1}{20}$$

When man and cycle moves up then component of weight opposes its motion i.e. $F = mg \sin\theta$

So power of the man $P = F \times v = mg \sin\theta \times v$

$$= 100 \times 9.8 \times \left(\frac{1}{20} \right) \times 2 = 98 \text{ Watt}$$

66.

$$\frac{\text{घूर्णन गतिज ऊर्जा}}{\text{कुल गतिज ऊर्जा}} = \frac{\frac{1}{2}mv^2 \left(\frac{K^2}{R^2} \right)}{\frac{1}{2}mv^2 \left(1 + \frac{K^2}{R^2} \right)} = \frac{K^2}{K^2 + R^2}$$

67.

$$\frac{1}{2} \frac{I_b I_t}{(I_t + I_b)} \omega_i^2$$

68.

$$R = 6 + 4 = 10 \Omega$$

$$X_L = \omega L = 2000 \times 5 \times 10^{-3} = 10 \Omega$$

$$X_C = \frac{1}{\omega C} = \frac{1}{2000 \times 50 \times 10^{-6}} = 10 \Omega$$

$$\therefore Z = \sqrt{R^2 + (X_L - X_C)^2} = 10 \Omega$$

$$\text{Amplitude of current} = i_0 = \frac{V_0}{Z} = \frac{20}{10} = 2 \text{ A}$$

$$R = 6 + 4 = 10 \Omega$$

$$X_L = \omega L = 2000 \times 5 \times 10^{-3} = 10 \Omega$$

$$X_C = \frac{1}{\omega C} = \frac{1}{2000 \times 50 \times 10^{-6}} = 10 \Omega$$

$$\therefore Z = \sqrt{R^2 + (X_L - X_C)^2} = 10 \Omega$$

$$\text{धारा का आयाम} = i_0 = \frac{V_0}{Z} = \frac{20}{10} = 2 \text{ A}$$

69. For any uniform rod. the mass is concentrated at its centre.
height of the mass from ground is, $h = (l/2) \sin 30^\circ$

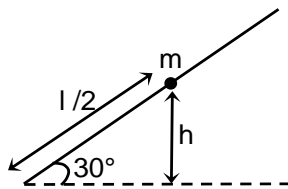
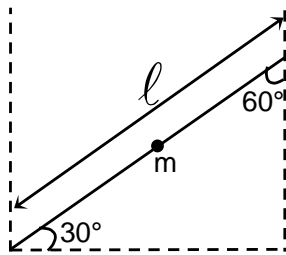
$$\text{Potential energy of the rod} = mgh = m \times g \times \frac{l}{2} \sin 30^\circ = m \times g \times \frac{l}{2} \times \frac{1}{2} = \frac{mgl}{4}$$

किसी भी समान छड़ के लिए, द्रव्यमान इसके केंद्र पर केंद्रित है।

जमीन से द्रव्यमान की ऊंचाई है $h = (l/2) \sin 30^\circ$

छड़ की संभावित ऊर्जा = $mgh =$

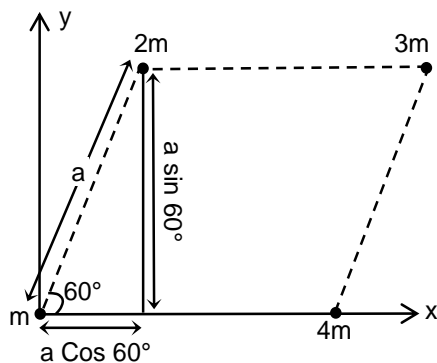
$$m \times g \times \frac{l}{2} \sin 30^\circ = m \times g \times \frac{l}{2} \times \frac{1}{2} = \frac{mgl}{4}$$



70. Work done कार्य $W = MB_H(1 - \cos \theta)$

$$= 20 \times 0.3(1 - \cos 30^\circ) = 6 \left(1 - \frac{\sqrt{3}}{2}\right) = 3(2 - \sqrt{3})$$

71. Let $m_1 = m$, $m_2 = 2m$, $m_3 = 3m$, $m_4 = 4m$



$$\vec{r}_1 = 0\hat{i} + 0\hat{j},$$

$$\vec{r}_2 = a \cos 60^\circ \hat{i} + a \sin 60^\circ \hat{j} = \frac{a}{2} \hat{i} + \frac{a\sqrt{3}}{2} \hat{j}$$

$$\vec{r}_3 = (a + a \cos 60^\circ) \hat{i} + a \sin 60^\circ \hat{j} =$$

$$\frac{3}{2} a \hat{i} + \frac{a\sqrt{3}}{2} \hat{j}$$

$$\vec{r}_4 = a \hat{i} + 0 \hat{j}$$

by substituting above value in the following formula

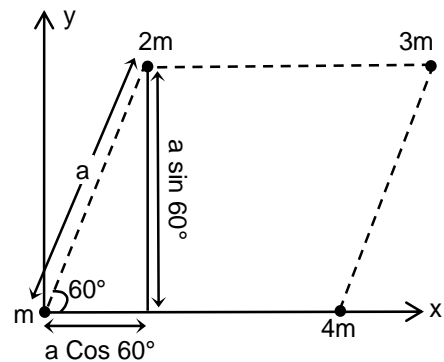
$$\vec{r} = \frac{m_1 \vec{r}_1 + m_2 \vec{r}_2 + m_3 \vec{r}_3 + m_4 \vec{r}_4}{m_1 + m_2 + m_3 + m_4} =$$

$$0.95a \hat{i} + \frac{\sqrt{3}}{4} a \hat{j}$$

So the location of centre of mass

$$\left[0.95a \hat{i} + \frac{\sqrt{3}}{4} a \hat{j} \right]$$

(2) माना $m_1 = m$, $m_2 = 2m$, $m_3 = 3m$, $m_4 = 4m$



$$\vec{r}_1 = 0\hat{i} + 0\hat{j},$$

$$\vec{r}_2 = a \cos 60^\circ \hat{i} + a \sin 60^\circ \hat{j} = \frac{a}{2} \hat{i} + \frac{a\sqrt{3}}{2} \hat{j}$$

$$\vec{r}_3 = (a + a \cos 60^\circ) \hat{i} + a \sin 60^\circ \hat{j} =$$

$$\frac{3}{2} a \hat{i} + \frac{a\sqrt{3}}{2} \hat{j}$$

$$\vec{r}_4 = a \hat{i} + 0 \hat{j}$$

ऊपर दर्शाये गये मान निम्न सूत्र में रखने पर

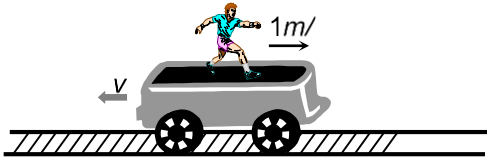
$$\vec{r} = \frac{m_1 \vec{r}_1 + m_2 \vec{r}_2 + m_3 \vec{r}_3 + m_4 \vec{r}_4}{m_1 + m_2 + m_3 + m_4}$$

$$= 0.95a \hat{i} + \frac{\sqrt{3}}{4} a \hat{j}$$

अतः द्रव्यमान केन्द्र की स्थिति

$$\left[0.95a \hat{i} + \frac{\sqrt{3}}{4} a \hat{j} \right]$$

72. If the man starts walking on the trolley in the forward direction then whole system will move in backward direction with same momentum.



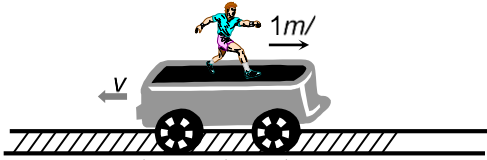
Momentum of man in forward direction =
Momentum of system (man + trolley) in backward direction

$$\Rightarrow 80 \times 1 = (80 + 320) \times v \Rightarrow v = 0.2 \text{ m/s}$$

So the velocity of man w.r.t. ground
 $1.0 - 0.2 = 0.8 \text{ m/s}$

\therefore Displacement of man w.r.t. ground
 $= 0.8 \times 4 = 3.2 \text{ m}$

यदि मनुष्य ट्रॉली पर आगे की ओर चलना प्रारम्भ कर देता है तो पूरा निकाय समान संवेग से पीछे की ओर चलेगा।



मनुष्य का आगे की ओर संवेग = निकाय (मनुष्य + ट्रॉली) का पीछे की ओर संवेग

$$\Rightarrow 80 \times 1 = (80 + 320) \times v \Rightarrow v = 0.2 \text{ m/s}$$

इसलिये मनुष्य का जमीन के सापेक्ष वेग
 $= 1.0 - 0.2 = 0.8 \text{ m/s}$

\therefore मनुष्य का जमीन के सापेक्ष विस्थापन
 $= 0.8 \times 4 = 3.2 \text{ m}$

73. According to FLOT (ऊष्मागतिकी के प्रथम नियम से)

$$\Delta Q = \Delta U + P(\Delta V) \Rightarrow \Delta U = \Delta Q - P(\Delta V)$$

$$= 1500 - (2.1 \times 10^5)(2.5 \times 10^{-3}) = 975 \text{ Joule}$$

74. Given spring system has parallel combination, so

$$k_{\text{eq}} = k_1 + k_2 \quad \text{and} \quad \text{time period}$$

$$T = 2\pi \sqrt{\frac{m}{k_1 + k_2}}$$

दिया गया निकाय स्प्रिंगों का समान्तर संयोजन है इसलिये

$$k_{\text{eq}} = k_1 + k_2 \quad \text{एवं आवर्तकाल} \quad T = 2\pi \sqrt{\frac{m}{k_1 + k_2}}$$

75. Suppose $n_A =$ known frequency = 100 Hz,
 $n_B = ?$
 $x = 2 =$ Beat frequency, which is decreasing after loading (i.e. $x \downarrow$)

Unknown tuning fork is loaded so $n_B \downarrow$

$$\text{Hence } n_A - n_B \downarrow = x \downarrow \longrightarrow \dots \text{ (i)}$$

Wrong

$$n_B \downarrow - n_A = x \downarrow \dots \text{ (ii)} \quad \text{---Correct}$$

$$\Rightarrow n_B = n_A + x = 100 + 2 = 102 \text{ Hz.}$$

माना $n_A =$ ज्ञात आवृत्ति = 100 Hz, $n_B = ?$

$x = 2 =$ विस्पंद आवृत्ति जो कि n_B को भारित करने पर घट रही है (अर्थात् $x \downarrow$)

अज्ञात स्वरित्र को भारित किया गया है अतः $n_B \downarrow$

$$\text{अतः } n_A - n_B \downarrow = x \downarrow \longrightarrow \dots \text{ (i)}$$

गलत

$$n_B \downarrow - n_A = x \downarrow \dots \text{ (ii)} \quad \text{--- सही}$$

$$\Rightarrow n_B = n_A + x = 100 + 2 = 102 \text{ Hz}$$

76. Fundamental frequency of open pipe is double that of the closed pipe.

खुले पाइप में कम्पनों की मूल आवृत्ति बन्द पाइप की तुलना में दोगुनी होती है।

77. $F = 6\pi\eta r v$

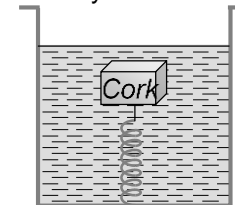
78. Since चूँकि $\Delta P \propto \frac{1}{R}$

79. Excess pressure अतिरिक्त दाब $\Delta P = \frac{4T}{r}$

$$= \frac{4 \times 2 \times 25 \times 10^{-3}}{1 \times 10^{-2}} = 20 \text{ Nm}^2 = 20 \text{ Pa}$$

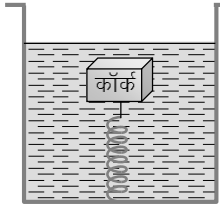
$$\left[\text{as } r = \frac{d}{2} \right]$$

80. Density of cork = d , Density of water = ρ



Resultant upward force on cork = $V(\rho - d)g$
This causes elongation in the spring. When the lift moves down with acceleration a , the resultant upward force on cork = $V(\rho - d)(g - a)$ which is less than the previous value. So the elongation decreases.

कॉर्क का घनत्व = d , जल का घनत्व = ρ

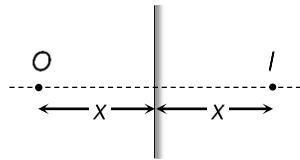


कॉर्क पर ऊपर की ओर परिणामी बल = $V(\rho - d)g$
इसके कारण स्प्रिंग में प्रसार होता है। यदि लिफ्ट a त्वरण से नीचे की ओर जा रही है, तब कॉर्क पर ऊपर की ओर लगने वाला परिणामी बल = $V(\rho - d)(g - a)$ जो कि प्रारंभिक मान से कम है, अतः स्प्रिंग में प्रसार घट जायेगा।

81. $\delta = (360 - 2\theta) = (360 - 2 \times 60) = 240^\circ$

82. Suppose at any instant, plane mirror lies at a distance x from object. Image will be formed behind the mirror at the same distance x .

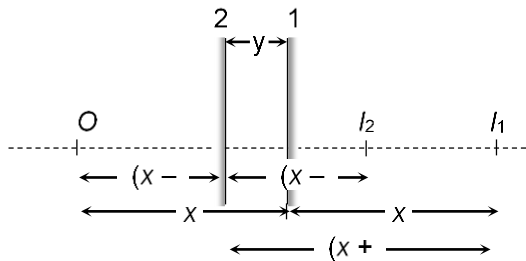
(3) माना किसी क्षण समतल दर्पण, वस्तु से x दूरी पर है, तब प्रतिबिम्ब दर्पण के पीछे समान दूरी x पर होगा



When the mirror shifts towards the object by distance 'y' the image shifts = $x + y - (x - y) = 2y$

So speed of image = $2 \times$ speed of mirror
जब दर्पण को वस्तु की ओर 'y' दूरी खिसकाया जाता है, तब प्रतिबिम्ब विस्थापन = $x + y - (x - y) = 2y$

इसलिए प्रतिबिम्ब की चाल = $2 \times$ दर्पण की चाल



83. $m = +\frac{1}{n} = -\frac{v}{u} \Rightarrow v = -\frac{u}{n}$

By using mirror formula दर्पण सूत्र

$$\frac{1}{f} = \frac{1}{-\frac{u}{n}} + \frac{1}{u} \Rightarrow u = -(n-1)f$$

84. Given $u = (f + x_1)$ and $v = (f + x_2)$

$$\text{The focal length } f = \frac{uv}{u+v} = \frac{(f+x_1)(f+x_2)}{(f+x_1)+(f+x_2)}$$

On solving, we get $f^2 = x_1x_2$ or $f = \sqrt{x_1x_2}$

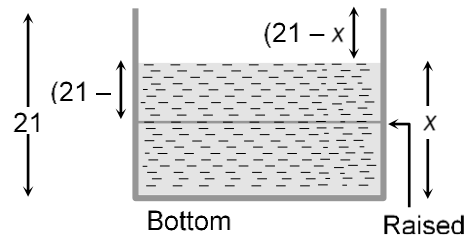
(2) दिया है, $u = (f + x_1)$ एवं $v = (f + x_2)$

$$\text{फोकस दूरी } f = \frac{uv}{u+v} = \frac{(f+x_1)(f+x_2)}{(f+x_1)+(f+x_2)}$$

हल करने पर $f^2 = x_1x_2$ या $f = \sqrt{x_1x_2}$

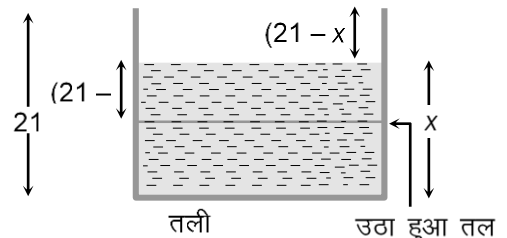
85. To see the container half-filled from top, water should be filled up to height x so that bottom of the container should appear to be raised upto height $(21-x)$. As shown in figure apparent depth $h' = (21 - x)$

Real depth $h = x$



$$\therefore \mu = \frac{h}{h'} \Rightarrow \frac{4}{3} = \frac{x}{21-x} \Rightarrow x = 12 \text{ cm}$$

प्रानुसार, पानी इतनी ऊँचाई x तक भरा जाना चाहिए, कि बर्तन की तली $(21-x)$ गहराई पर दिखे, तभी बर्तन आधा भरा हुआ प्रतीत होगा चित्रनुसार आभासी गहराई $h' = (21 - x)$ वास्तविक गहराई $h = x$



$$\therefore \mu = \frac{h}{h'} \Rightarrow \frac{4}{3} = \frac{x}{21-x} \Rightarrow x = 12 \text{ cm}$$

86. Along the axis of magnet

$$B_a = \frac{2M}{X^3} = 200 \text{ guass}$$

$$\Rightarrow B_a = \frac{M}{X^3} = 100 \text{ guass}$$

चुम्बक के अक्ष पर $B_a = \frac{2M}{X^3} = 200$ गॉस

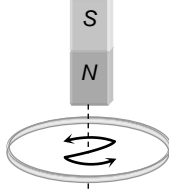
$$\Rightarrow B_e = \frac{M}{X^3} = 100 \text{ गॉस}$$

87. Attracts only magnetic substances
केवल चुम्बकीय पदार्थों को आकर्षित करता है

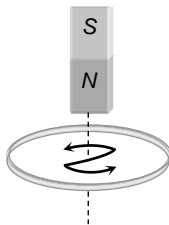
$$88. e = -\frac{d\phi}{dt} = -(16t + 3) = -67 \text{ units}$$

$$e = -\frac{d\phi}{dt} = -(16t + 3) = -67 \text{ यूनिट}$$

89. As it is seen from the magnet side induced current will be anticlockwise.



चुम्बक की ओर से देखने पर प्रेरित धारा की दिशा वामावर्ती है।



$$90. e = \frac{1}{2} B \omega r^2$$

$$= \frac{1}{2} \times 0.2 \times 10^{-4} \times 5 \times (1)^2 = 50 \mu V$$

91. For 'XNOR' gate $Y = \bar{A}\bar{B} + AB$

$$\text{i.e. } 0 \cdot 0 + 0 \cdot 0 = 1 \cdot 1 + 0 \cdot 0 = 1 + 0 = 1$$

$$0 \cdot 1 + 0 \cdot 1 = 1 \cdot 0 + 0 \cdot 1 = 0 + 0 = 0$$

$$1 \cdot 0 + 1 \cdot 0 = 0 \cdot 1 + 1 \cdot 0 = 0 + 0 = 0$$

$$1 \cdot 1 + 1 \cdot 1 = 0 \cdot 0 + 1 \cdot 1 = 0 + 1 = 1$$

'XNOR' गेट के लिये $Y = \bar{A}\bar{B} + AB$

$$\text{अर्थात् } 0 \cdot 0 + 0 \cdot 0 = 1 \cdot 1 + 0 \cdot 0 = 1 + 0 = 1$$

$$0 \cdot 1 + 0 \cdot 1 = 1 \cdot 0 + 0 \cdot 1 = 0 + 0 = 0$$

$$1 \cdot 0 + 1 \cdot 0 = 0 \cdot 1 + 1 \cdot 0 = 0 + 0 = 0$$

$$1 \cdot 1 + 1 \cdot 1 = 0 \cdot 0 + 1 \cdot 1 = 0 + 1 = 1$$

92. Both decreases

दोनों घटते हैं

93. |

94. By using $h\nu - h\nu_0 = K_{\max}$

$$\Rightarrow h(\nu_1 - \nu_0) = K_1 \quad \dots(i)$$

$$\text{And एवं } h(\nu_2 - \nu_0) = K_2$$

....(ii)

$$\Rightarrow \frac{\nu_1 - \nu_0}{\nu_2 - \nu_0} = \frac{K_1}{K_2} = \frac{1}{K}$$

$$\text{Hence अतः } \nu_0 = \frac{K\nu_1 - \nu_2}{K-1}$$

95. Excitation energy

$$\Delta E = E_2 - E_1 = 13.6 Z^2 \left[\frac{1}{1^2} - \frac{1}{2^2} \right]$$

$$\Rightarrow 40.8 = 13.6 \times \frac{3}{4} \times Z^2 \Rightarrow Z = 2.$$

Now required energy to remove the electron from ground state

$$= \frac{+13.6Z^2}{(1)^2} = 13.6(Z)^2 = 54.4 \text{ eV.}$$

$$\text{उत्तेजन ऊर्जा } \Delta E = E_2 - E_1 = 13.6 Z^2 \left[\frac{1}{1^2} - \frac{1}{2^2} \right]$$

$$\Rightarrow 40.8 = 13.6 \times \frac{3}{4} \times Z^2 \Rightarrow Z = 2.$$

अब इलेक्ट्रॉन को मूल अवस्था से बाहर निकालने के लिए आवश्यक ऊर्जा

$$= \frac{+13.6Z^2}{(1)^2} = 13.6(Z)^2 = 54.4 \text{ eV.}$$

$$96. r \propto A^{1/3} \Rightarrow \frac{r_1}{r_2} = \left(\frac{A_1}{A_2} \right)^{1/3}$$

$$\Rightarrow \frac{3}{5} = \left(\frac{27}{A} \right)^{1/3} \Rightarrow \frac{27}{125} = \frac{27}{A} \Rightarrow A = 125$$

Number of nuclei in atom X X परमाणु में नाभिकों की संख्या = $A - 52 = 125 - 52 = 73$.

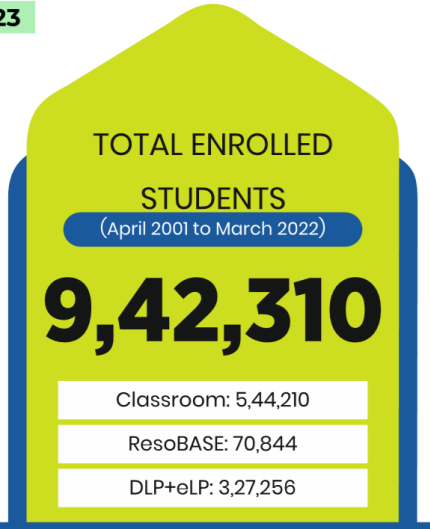
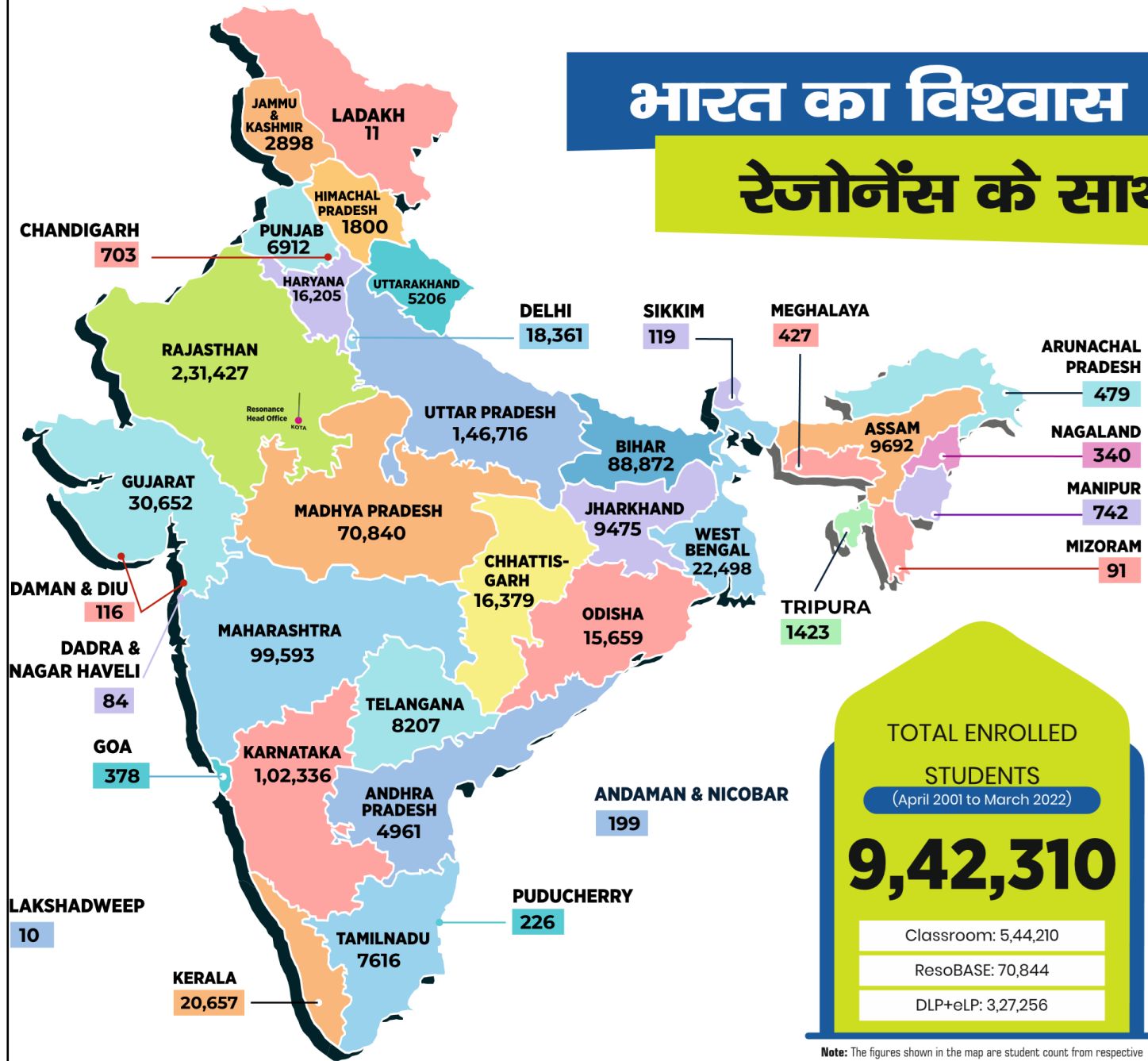
97. The equation is $O^{17} \rightarrow {}_0n^1 + O^{16}$
 \therefore Energy required = B.E. of O^{17} – B.E. of O^{16}
 $= 17 \times 7.75 - 16 \times 7.97 = 4.23 \text{ MeV}$
समीकरण $O^{17} \rightarrow {}_0n^1 + O^{16}$
 \therefore आवश्यक ऊर्जा = O^{17} की बन्धन ऊर्जा – O^{16} की बन्धन ऊर्जा
 $= 17 \times 7.75 - 16 \times 7.97 = 4.23 \text{ MeV}$
98. $c = \frac{E}{B} \Rightarrow B = \frac{E}{c} = \frac{18}{3 \times 10^8} = 6 \times 10^{-8} \text{ T}$.
99. Statement-1 is True, Statement-2 is True;
Statement-2 is **NOT** a correct explanation for Statement-1
वक्तव्य-1 सत्य है, वक्तव्य-2 सत्य है ; वक्तव्य-2 वक्तव्य-1 का सही स्पष्टीकरण नहीं है।
100. (A) \rightarrow (R), (B) \rightarrow (S), (C) \rightarrow (Q), (D) \rightarrow (P)

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



भारत का विश्वास

रेजोनेंस के साथ



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