Resonance®
Educating for better tomorrow

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	XI	COURSE NAME	SAKSHAM	COURSE CODE	MA
PHASE CODE(S)	02 MA	TOTAL PAGES	12	BATCH CODE(S)	02 MA

Target Examination & Year:

NEET 2025

TEST PATTERN	TEST TYPE	TEST CODE & SEQUENCE
NEET	PART TEST	PT-4

DATE & DAY:
03rd Dec. 2023 | Sunday

Duration & Time:
200 Minutes | 11:30 AM to 2:50 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 → Coming Soon

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

ANSWER KEY (AK)

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

STUDENT'S SPACE

TEXT SOLUTIONS (TS)

PAPER

PART-A: CHEMISTRY

1. $16r_1 = \frac{r \times n^2}{z}$ (here z = 1)

therefore n = 4

$E_4 = -13.6\ \frac{z^2}{n^2}\ eV = -\frac{13.6}{16} = -0.853\ eV$

2. $Z = 2 \Rightarrow n_1 = 1 \Rightarrow n_2 = \infty$

$\bar{\nu} = R(2)^2\left(\frac{1}{1^2} - \frac{1}{\infty^2}\right) = 4R$

3. (1) $6 \to 3$ $\quad \Delta n = 3$

$\therefore$ no. of lines = $\frac{3(3+1)}{2} = 6$

All lines are in infrared region

(2) $7 \to 3$ $\quad \Delta n = 4$

$\therefore$ no. of lines = $\frac{4(4+1)}{2} = 10$

All lines are in infrared region

(3) $5 \to 2$ $\quad \Delta n = 3$

All lines are in visible region

(4) $6 \to 2$ $\quad \Delta n = 4$

All lines are in visible region

4. d_{z^2} has shape like baby soother.

5. Cu^{2+} : [Ar]$3d^9$ (One unpaired e)

Cr^{3+} : [Ar]$3d^3$ (Three unpaired e)

spin only magnetic moment = $\sqrt{3(3+2)}$

= $\sqrt{15}$

Ti^{4+} : [Ar] $3d^0\ 4s^0$ (0 unpaired e)

spin only magnetic moment = $\sqrt{0(0+2)}$

= 0

Ag^+ : [Kr] $3d^{10}$ (0 unpaired e)

6. ℓ should be $\geq$ 2 (as m = 2)

For p orbital ℓ = 1.

7. Element $\quad 1s^2\ 2s^2\ 2p^6\ 3p^6\ 4s^2\ 3d^{10}\ 4p^6\ 5s^2\ 4d^x$ For 3d, 4p, 5p ; $n + \ell = 5$.

Cation (2+) $\quad 1s^2\ 2s^2\ 2p^6\ 3p^6\ 4s^2\ 3d^{10}\ 4p^6\ 5s^0\ 4d^x$

8. 8

9. n = 4, m = – 3

$\therefore$ only possible value of ℓ is 3.

$\therefore$ Orbital angular momentum

$= \sqrt{\ell(\ell+1)}\ \frac{h}{2\pi} = \frac{2\sqrt{3}\,h}{2\pi} = \frac{\sqrt{3}\,h}{\pi}$.

10. Infrared lines = total lines – visible lines – UV lines

$= \frac{6(6-1)}{2} - 4 - 5 = 15 - 9 = 6.$

(visible lines = 4 $\quad 6\to2,\ 5\to2,\ 4\to2,\ 3\to2$)

(UV lines = 5 $\quad 6\to1,\ 5\to1,\ 4\to1,\ 3\to1,\ 2\to1$)

11. $\lambda = \frac{12.3}{\sqrt{v}} A^o$

12. $^{78}_{34}Se$

13. $2 \times 10^6\ m^{-1}$

14. P^{3-}, S^{2-}, Cl^-, Ar

15. $\frac{\lambda_1}{\lambda_2} = \sqrt{\frac{V_2}{V_1}} = \sqrt{\frac{50}{100}}$

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

17. Radio waves

18. $\Delta p\ .\ \Delta x = \frac{h}{4\pi}$

$\Rightarrow \quad \Delta x = \frac{6.62 \times 10^{-34}}{4 \times 3.14 \times 1 \times 10^{-10}} = 5.27 \times 10^{-25}$ m.

19. Number of values of ℓ = total number of subshells = n.

Value of ℓ = 0,1,2.....(n – 1).

$\ell = 2 \Rightarrow$ m = – 2, – 1, 0, + 1 , + 2 (5 values)

m = + ℓ to – ℓ through zero.

20. 5^{th} orbit to 2^{nd} orbit

21. It is fact.

22. $H\ \overline{\sigma}\ C\ \frac{\overline{\pi}}{\overline{\sigma}}\ C\ \overline{\sigma}\ H$

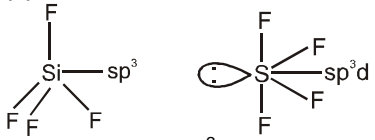
23. s-character increases of hybrid orbital than bond angle also increases.

24. As the p-orbital in hybrid orbital increases than % p-character increases.

25. Steric number = 3 + 1 = 4 ; so the hybridization is sp^3 .

26. Steric number = 0 + 3 = 3; so sp^2 hybridisation

27. (1) Tetrahedral and see-saw shaped.



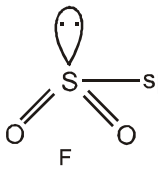
(2) Both are sp^3 hybridised and trigonal pyramid.

(3) Both are sp^3 hybridised and tetrahedral.

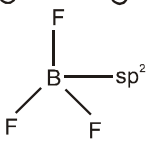
(4) Both are sp^3d^2 hybridised and octahedral.

28. (i) SF_4 Steric no. = 5, Lone pair = 1
(ii) $[PCl_4]^+$ Steric no. = 4, Lone pair = 0
(iii) XeO_2F_2 Steric no. = 5, Lone pair = 1
(iv) $ClOF_3$ Steric no. = 5, Lone pair = 1

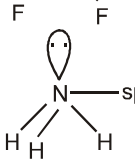
29. (1) $S = C = S$ (linear)
sp

(2) 

(bent)

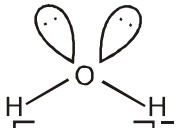
(3) 

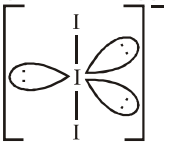
(trigonal planar)

(4) 

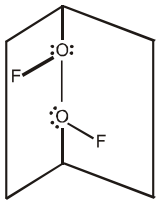
(trigonal pyramidal)

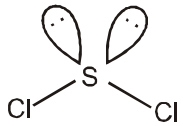
30. To have minimum repulsions, the two lone pair occupy the trans positions in octahedral geometry.

31. (1) 

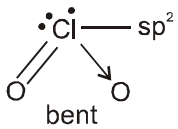
(2) 

Number of bond pairs around I = 2. Number of lone pairs around I = 3.

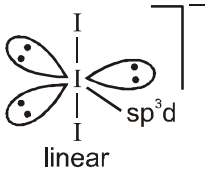
(3) 

(4) 

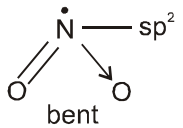
32. (1) $O = C = O$
sp
linear

(2) 

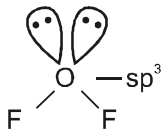
bent

(3) 

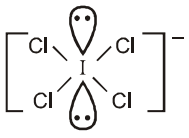
linear

(4) 

bent

33. 

(bent)

34. 

(square planar)

35. (1) The sulphur is in sp^2 hybridisation but due to lp-bp repulsion the bond angle decreases to 119.5º.
(2) The oxygen is in sp^3 hybridisation but due to lp-lp repulsion the bond angle decreases to 104.5º.
(3) It is believed that pure p atomic orbitals participate in bonding and due to lp-lp repulsion the bond angle decreases to 92.5º.
(4) The nitrogen is in sp^3 hybridisation but due to lp-bp repulsion the bond angle decreases to 107º.

	SO_2	OH_2	SH_2	NH_3
Bond angle :	119.5^o	104.5^o	92.5^o	107^o

36. (1)-r, (2)-s, (3)-p, (4)-q

37. Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.

38. n = 3, l = 2, m = – 2, s = +1/2

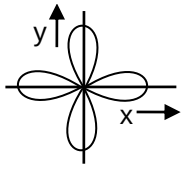
39. (A) Atoms of all elements are composed of three fundamental Particles
(B) Mass of electron is 9.1×10^{-31} kg.
(C) All isotopes of a given element show same chemical properties
(D) Proton and Neutron are collectively known as nucleorys
(E) Dalton's atomic theory, regard the atom as an ultimate particle of matter
correct option B, C, E

40. Hund's Rule

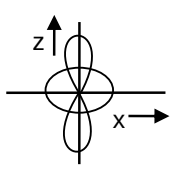
41. $E_n = E_1 \frac{Z^2}{n^2}$

$E_5 = -13.6 \times \frac{(1)^2}{(5)^2} = -0.54$ eV

42. In correct statement:
Shape of dxy, dyz & dxz are same but shape of $d_{x^2-y^2} - d_{z^2}$ is different



$d_{x^2-y^2}$



d_{z^2}

43. m gives the energy of the electron in the orbital

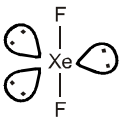
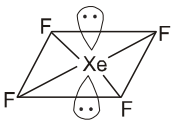
44. Lower the (n + l) of an electron, lower will be its energy. If for any two electrons (n + l) is same, the electron with lower value of n, has lower energy. Hence, the correct order of energy is :

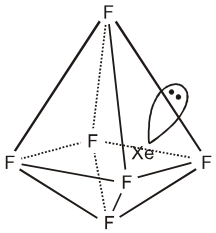
$n = 2, \ell = 1$ < $n = 3, \ell = 0$ < $n = 4, \ell = 0$ < $n = 3, \ell = 2$

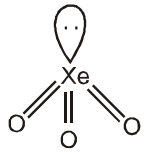
$(n + \ell = 3)$ $(n + \ell = 3)$

$(n + \ell = 4)$ $(n + \ell = 5)$

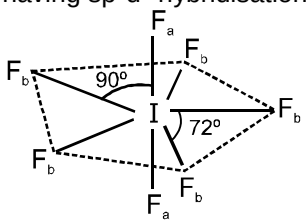
45. Atoms of same element may be different in mass i.e concept of isotopes.
Nucleus contains neutrons and proton, not electron.
Anode ray consist of cations present in discharge tube.
For production of cathode rays in a discharge tube, the gas filled should be at a low pressure.

46. XeF_2 :  ; XeF_4 : 

XeF_6 :  ;

XeO_3 : 

47. The structure is pentagonal bipyramid having sp^3d^3 hybridisation as given below :



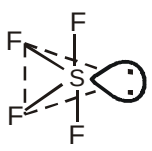
$F_b - I - F_b = 72^o$ (5 number) ;

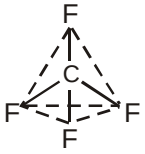
$F_b - I - F_a = 90^o$ (10 number)

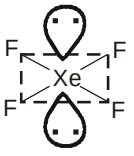
$F_b - I$ bond length = 1.858 ± 0.004 Å ;

$F_a - I$ bond length = 1.786 ± 0.007 Å.

48. According to VSEPR theory


$\ell p = 1$


$\ell p = 0$

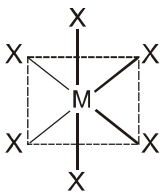

$\ell p = 2$

sp^3 d-hybridisation sp^3-hybridisation

sp^3d^2-hybridisation

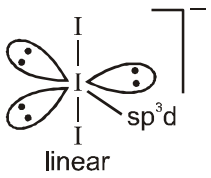
see-saw shape tetrahedral shape

square planar shape

49. 

Maximum 12 bond angles are of 90º.

50. Assertion and Reason both are correct statement and Reason is the correct statement of Assertion, e.g., NO_2^+ and I_3^- have different hybridisation but on account of stability they have linear shape as given below.

$\overset{+}{O} = N = O$ (linear) and 

sp linear

PART-B: PHYSICS

51. $\left|\overrightarrow{\Delta v}\right| = 2v\sin(\theta/2) = 2v\sin\left(\frac{90}{2}\right) = 2v\sin 45 = v\sqrt{2}$

52. (11/12)L

53. $W = F \times s = F \times v \times t = 5 \times 2 \times 60 = 600\,J$

54. By using equation $\omega^2 = \omega_0^2 - 2\alpha\theta$

$$\left(\frac{\omega_0}{2}\right)^2 = \omega_0^2 - 2\alpha(2\pi n)$$

$$\Rightarrow \alpha = \frac{3}{4}\frac{\omega_0^2}{4\pi \times 36}, \text{ (n = 36) ..(i)}$$

Now let fan completes total n′ revolution from the starting to come to rest

$$0 = \omega_0^2 - 2\alpha(2\pi n') \Rightarrow n' = \frac{\omega_0^2}{4\alpha\pi}$$

substituting the value of α from equation (i)

$$n' = \frac{\omega_0^2}{4\pi}\frac{4 \times 4\pi \times 36}{3\omega_0^2} = 48 \text{ revolution}$$

Number of rotation = 48 – 36 = 12

55. Difference in kinetic energy
$= 2mgr = 2 \times 1 \times 10 \times 1 = 20J$

56. (7.5, 7.5, 7.5)

57. $\omega = \frac{d\theta}{dt} = \frac{d}{dt}(2t^3 + 0.5) = 6t^2$

at t =2 s, $\omega = 6 \times (2)^2 = 24 rad/s$

58. 40 cm

59. (A) – q ; (B) – s ; (C) – p ; (D) r

60. $W\int_0^{x_1} F.dx = \int_0^{x_1} Cx\,dx = C\left[\frac{x^2}{2}\right]_0^{x_1} = \frac{1}{2}Cx_1^2$

61. Average velocity $= \frac{\text{Total displacement}}{\text{time}} = \frac{2m}{1s} = 2ms^{-1}$

62. Centre of mass always lies towards heavier mass.

63. Tension at the top of the circle, $T = m\omega^2 r - mg$

$T = 0.4 \times 4\pi^2 n^2 \times 2 - 0.4 \times 9.8 = 115.86\,N$

64. Force exerted by the ball on hands of the player $= \frac{mdv}{dt} = \frac{0.15 \times 20}{0.1} = 30\ N$

65. While moving along a circle, the body has a constant tendency to regain its natural straight line path .This tendency gives rise to a force called centrifugal force. The centrifugal force does not act on the body in motion, the only force acting on the body in motion is centripetal force. The centrifugal force acts on the source of centripetal force to displace it radially outward from centre of the path.

66. For a given mass $P \propto v$. If the momentum is constant then it's velocity must have constant.

67. $v = \sqrt{3gr}$ and $a = \frac{v^2}{r} = \frac{3gr}{r} = 3g$

68. $\vec{F}\Delta t = m\Delta\vec{v} \Rightarrow F = \frac{m\Delta\vec{v}}{t}$

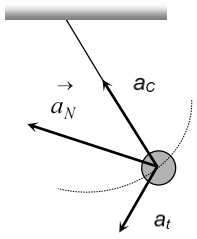
By doing so time of change in momentum increases and impulsive force on knees decreases.

69. a_c = centripetal acceleration

a_t = tangential acceleration

a_N = net acceleration

= Resultant of a_c and a_t



70. Momentum acquired by the particle is numerically equal to area enclosed between the F-t curve and time axis. For the given diagram area in upper half is positive and in lower half is negative (and equal to upper half), so net area is zero. Hence the momentum acquired by the particle will be zero.

71. $\sqrt{gr}$

72. Conservation of linear momentum

73. In the given condition friction provides the required centripetal force and that is constant. i.e. $m\omega^2 r$=constant

$\Rightarrow r \propto \frac{1}{\omega^2} \therefore\ r_2 = r_1\left(\frac{\omega_1}{\omega_2}\right)^2 = 9\left(\frac{1}{3}\right)^2 = 1cm$

74. $\vec{v}_{cm} = \frac{m_1\vec{v}_1 + m_2\vec{v}_2}{m_1 + m_2} = \frac{2\times 3 + 3\times 2}{2+3} = \frac{12}{5} = 2.4m/s$

75.

$v = \sqrt{2gl(1-\cos\theta)} = \sqrt{2\times 9.8\times 2(1-\cos 60°)}$

$= 4.43m/s$

76. $m_1 = 2kg, m_2 = 4kg, \vec{v}_1 = 2m/s, \vec{v}_2 = -10m/s$

$\vec{v}_{cm} = \frac{m_1\vec{v}_1 + m_2\vec{v}_2}{m_1 + m_2} = \frac{2\times 20 - 4\times 10}{2+4} = 0\ m/s$

77. Net acceleration in nonuniform circular motion,

$a = \sqrt{a_t^2 + a_c^2} = \sqrt{(2)^2 + \left(\frac{900}{500}\right)^2} = 2.7m/s^2$

a_t = tangential acceleration

a_c = centripetal acceleration $= \frac{v^2}{r}$

78. The radius of curvature of outer rail will be greater than that of the inner rail

79. 1/3

80. If momentum remains constant then force will be zero because $F = \frac{dP}{dt}$

81. T = tension, W = weight and F = centrifugal force.

82. $\left(\frac{m_1 - m_2}{m_1 + m_2}\right)^2 g$

83. $\sqrt{5gl}$

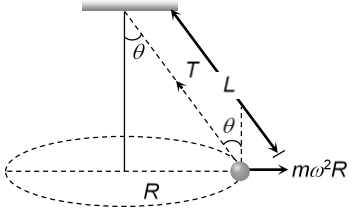
84. 3.2 m

85. $v = \sqrt{2gh} = \sqrt{2\times10\times0.2} = 2\,m/s$

86. $T\sin\theta = M\omega^2R$ …(i)

$T\sin\theta = M\omega^2L\sin\theta$ …(ii)

From (i) and (ii)



$T = M\omega^2L$

$= M4\pi^2n^2L$

$= M4\pi^2\left(\frac{2}{\pi}\right)^2 L$

$= 16ML$

87. $h = \frac{R}{3}$

88. omentum of one piece $= \frac{M}{4}\times3$

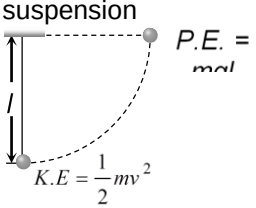
Momentum of the other piece $= \frac{M}{4}\times4$

$\therefore$ Resultant momentum $= \sqrt{\frac{9M^2}{16}+M^2} = \frac{5M}{4}$

The third piece should also have the same momentum. Let its velocity be v, then

$\frac{5M}{4} = \frac{M}{2}\times v$ or $v = \frac{5}{2} = 2.5\,m/sec$

89. Kinetic energy given to a sphere at lowest point = potential energy at the height of suspension



$\Rightarrow \frac{1}{2}mv^2 = mgl$

$\therefore v = \sqrt{2gl}$

90. $m_Gv_G = m_Bv_B$

$\Rightarrow v_B = \frac{m_Gv_G}{m_B} = \frac{1\times5}{10\times10^{-3}} = 500\,m/s$

91. The inclination of person from vertical is given by,

$\tan\theta = \frac{v^2}{rg} = \frac{(10)^2}{50\times10} = \frac{1}{5}$ $\therefore$ $\theta = \tan^{-1}(1/5)$

92. $mg = 20N$ and $\frac{mv^2}{r} = \frac{2\times(4)^2}{1} = 32N$

It is clear that 52 N tension will be at the bottom of the circle. Because we know that

$T_{Bottom} = mg + \frac{mv^2}{r}$

93. Zero

94. Tension in the string $T_0 = mR\omega_0^2$

In the second case $T = m(2R)(4\omega_0^2) = 8mR\omega_0^2 = 8T_0$

95. When the milk is churned centrifugal force acts on it outward and due to which cream in milk is separated from it.

96. Area between curve and displacement axis

$= \frac{1}{2}\times(12+4)\times10 = 80$ J

In this time body acquire kinetic energy

$= \frac{1}{2}mv^2$

by the law of conservation of energy

$\frac{1}{2}mv^2 = 80J$

$\Rightarrow \frac{1}{2}\times0.1\times v^2 = 80$

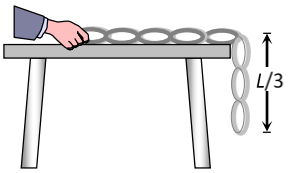
$\Rightarrow v^2 = 1600$

$\Rightarrow v = 40$ m/s

97. Both **Assertion** and **Reason** are false

98. In inverse ratio of masses of particles

99.



$W = \frac{MgL}{2n^2} = \frac{MgL}{2(3)^2} = \frac{MgL}{18}$ (n = 3)

100. The centripetal force, $F = \frac{mv^2}{r}$

$\Rightarrow r = \frac{mv^2}{F}$

$\therefore$ $r \propto v^2$ or $v \propto \sqrt{r}$

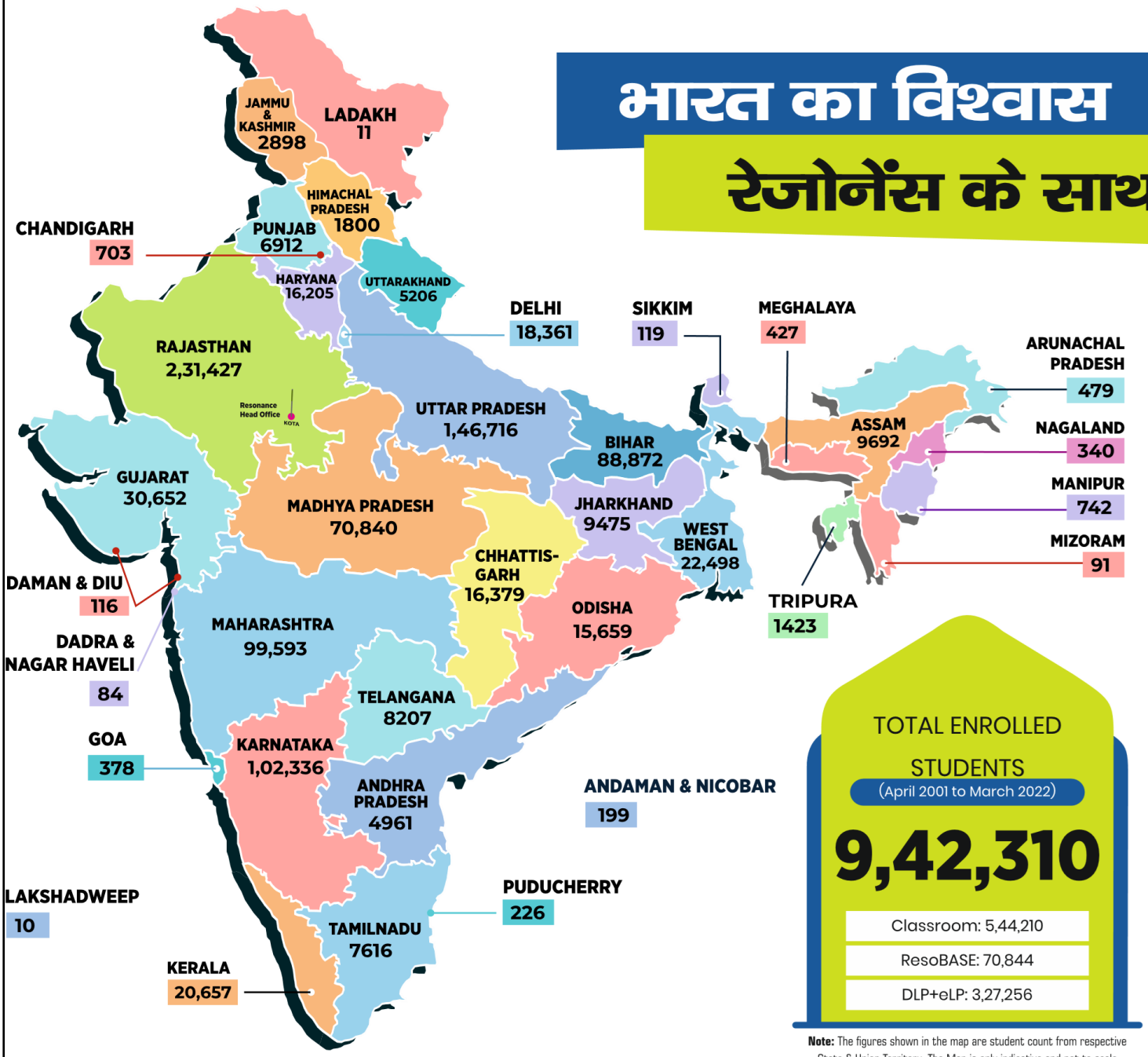
(If m and F are constant),

$\Rightarrow \frac{v_1}{v_2} = \sqrt{\frac{r_1}{r_2}} = \sqrt{\frac{1}{2}}$

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

Resonance®
Educating for better tomorrow

भारत का विश्वास
रेजोनेंस के साथ



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