

**HINTS & SOLUTIONS**
**PART-A (PHYSICS)**

2. An open.....

Sol. As  $\frac{V}{2l} = \frac{330 \times 100}{2 \times 33} = 500 \text{ Hz}$

In second harmonic frequency =  $\frac{V}{l} = 1000 \text{ Hz}$ .

7. An observer.....

Sol.  $O \rightarrow \frac{v}{5} \leftarrow \begin{matrix} v, f \\ \text{sound} \\ s \\ \text{rest} \end{matrix}$

$$f' = f \left( \frac{v + v/5}{v - 0} \right)$$

$$f' = \frac{6}{5} f$$

% changes  $\frac{\frac{6}{5}f - f}{f} \times 100 = \frac{1}{5} \times 100 = 20\%$

8. Both the.....

Sol.  $V \propto \sqrt{T}$

$$\frac{V_1}{V_2} = \sqrt{\frac{T_1}{T_2}} = \sqrt{\frac{T/2}{T}} = \frac{1}{\sqrt{2}}$$

11. A stretched.....

Sol.  $\frac{n}{2l} \sqrt{\frac{T}{\mu}} = 350$  and  $\frac{n+1}{2l} \sqrt{\frac{T}{\mu}} = 420$

$$\therefore \frac{n}{n+1} = \frac{350}{420} \Rightarrow n = 5$$

$$\therefore \frac{5\lambda}{2} = l \Rightarrow \lambda = \frac{2l}{5}$$

$$\frac{v}{f} = \frac{2l}{5} \Rightarrow \frac{v}{2l} = \frac{f}{5} \Rightarrow f' = \frac{f}{5} = 70 \text{ Hz}$$

12. A person.....

Sol.  $\beta = 10 \log \frac{I}{I_0}$ ,  $60 = 10 \log \frac{I}{I_0}$

$$\beta = 10 \log \frac{8I}{I_0} = 10 \log 8 + 10 \log \frac{I}{I_0} = 30 \log 2 + 60 = 69 \text{ dB}$$

14. When a.....

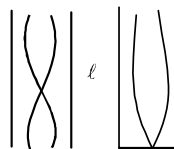
Sol. When a sound wave gets reflected from a rigid boundary, the particles at the boundary are unable to vibrate. Thus, a reflected wave is generated which interferes with the oncoming wave to produce zero displacement at the rigid boundary. At these points (zero displacement), the pressure variation is maximum. Thus, a reflected pressure wave has the same phase as the incident wave.

15. Equation of.....

Sol.  $a_{\max} = \omega_n^2 A = (20\pi)^2 \times 0.01$   
 $a_{\max} = 40 \text{ m/sec}^2$

16. A closed.....

Sol.  $256 + n = 262 - 2n$   
 $3n = 6$   
 $n = 2$



$$\eta_1 = \frac{V}{2l} \quad \eta_2 = \frac{V}{4l}$$

$$\text{no. of beat heard } n_1 - n_2 = \frac{V}{4l} = 4$$

if length pipes are doubled. no of beats heard

$$n_1^1 - n_2^1 = \frac{V}{8l} = \frac{4}{2} = 2$$

17. Three waveforms.....

Ans. The waves can be added using a phasor diagram.

18. Equation of.....

Sol.  $\frac{\omega}{K} = V_\omega$  for either component waves

20. A tube.....

Sol. According to given condition

$$4 \left( \frac{\ell}{2} + e \right) = 2 \left( \frac{\ell}{2} + 2e \right)$$

$$e = \frac{\ell}{24}$$

$$\text{So } r = \frac{10e}{6} \Rightarrow r = \frac{5\ell}{72}$$

22. A tuning.....

**Sol.** As the tuning fork is in resonance with air column in the pipe closed at one end.

$$f = \frac{nv}{4L} \text{ with } n = 1; 3; 5 \dots\dots$$

So length of air column in the pipe

$$h = \frac{nv}{4f} = 25 \text{ n cm.}$$

i.e.  $L = 25 \text{ cm}; 75 \text{ cm}; 125 \text{ cm} \dots\dots$

So  $L = h = 130 \text{ cm}$

$$h = 130 - L$$

$$h_{\min} = 130 - L_{\max} = 130 - 125 = 5 \text{ cm.}$$

23. A transverse.....

$$\text{Sol. } P_{\text{av}} = 2\pi^2 f^2 A^2 \mu v$$

$$P_{\text{av}} = 2\pi^2 f^2 A^2 \mu \sqrt{T/\mu}$$

Put value  $P_{\text{av}} = 50 \text{ mW}$

$$\text{use } v = \sqrt{T/\mu}$$

24. A 1 m long.....

**Sol.**  $L = 1 \text{ m}$

$M = 0.04 \text{ kg}$

$$\mu = \frac{M}{L} = 0.04 \text{ kg/m}$$

$$\therefore v = \sqrt{\frac{T}{\mu}} = \sqrt{\frac{400}{0.04}} = 100 \text{ m/sec}$$

For fundamental frequency

$$L = \frac{\lambda}{4} \Rightarrow \lambda = 4L = 4 \text{ m}$$

$$\therefore f_1 = \frac{100}{4} = 25 \text{ Hz}$$

$$(i) \frac{\lambda_1}{4} = L = 1$$

$$\lambda_1 = 4 \text{ m}$$

$$(ii) \frac{3\lambda_2}{4} = L = 1$$

$$\lambda_2 = \frac{4}{3} \text{ m}$$

$$(iii) \frac{5\lambda_3}{4} = L$$

$$\lambda_3 = \frac{4}{5} \text{ m}$$

25. A tuning.....

**Sol.** Beats

Frequency of tuning for 512 Hz Frequency of sonomete wire either  $512 + 6$  or  $512 - 6$

As tersion increas Frequency of sonometre wire increase  $n$

$$\propto \sqrt{T}$$

No. of beat reduces. so that Frequency of sonometa wire is  $512 - 6 = 506 \text{ Hz}$

26. The plane.....

**Sol.** Standard equation

27. In a stationary.....

**Sol.** By difination

29. At displacement.....

**Sol.** Self -explanatory

30. At the closed.....

**Sol.** At closed end Displacement node and pressure antinode.

## PART-B (CHEMISTRY)

31. An ideal gas .....

**Sol.** It is adiabatic free expansion where  $\Delta T = 0$

32. 8 g of O<sub>2</sub> gas .....

**Sol.** expansion work,

$$W = -p_{\text{ext}} \Delta V = -p_{\text{ext}} (V_{\text{final}} - V_{\text{initial}})$$

$$p_{\text{ext}} = 1 \text{ atm}$$

$$V_{\text{initial}} = \text{volume of 8g } (= \frac{1}{4} \text{ mol})$$

$$= 22.4 \times \frac{1}{4} = 5.6 \text{ L}$$

$$V_{\text{final}} = 2 \times 5.6 = 11.2 \text{ L}$$

$$\therefore \Delta V = 11.2 - 5.6 = 5.6 \text{ L}$$

$$\text{Thus, } W = -(1 \text{ atm} \times 5.6 \text{ L}) = -5.6 \text{ L atm}$$

33. The condensation .....

**Sol.** For condensation of a gas into liquid,

$$\Delta H = -ve$$

$$\Delta S = -ve$$

34. For the given reaction .....

**Sol.**  $\Delta G^\circ = -2.303 RT \log K$

$$\Rightarrow -1.3818 \text{ kcal}$$

$$= 2.303 \times 2 \times 10^{-3} \text{ kcal mol}^{-1} \text{ k}^{-1} \times 300 \times \log k$$

$$\Rightarrow \log k = 1$$

$$\therefore k = 10$$

35.  $\text{Ca}(\text{HCO}_3)_2$  is strongly .....

**Sol.** Initially  $\text{H}_2\text{O}(\text{g})$  is in gaseous phase, but at  $25^\circ\text{C}$ ,  $\text{H}_2\text{O}(\text{g})$  is liquefied to  $\text{H}_2\text{O}(\text{l})$

Thus pressure is due to  $\text{CO}_2(\text{g})$  only

$$K_p = P_{\text{CO}_2}^2 = 36$$

$$\therefore P_{\text{CO}_2} = 6 \text{ atm}$$

36. The equilibrium which .....

**Sol.** If  $\Delta n_g = 0$ . The equilibrium is not affected by change in pressure or volume

$$(1) \Delta n_g = 0 \quad (2) \Delta n_g = -2$$

$$(3) \Delta n_g = 1 \quad (4) \Delta n_g = -1$$

37. At  $250^\circ\text{C}$  required .....

$$\text{Sol. } K_p = \frac{\alpha^2 p}{1 - \alpha^2}$$

$$\left[ \alpha = \frac{1}{2} \right]$$

38. Which of the following .....

**Sol.**  $\text{H}_3\text{O}^+$  (acid),  $\text{H}_2\text{O}$  (conjugate base) not  $\text{OH}^-$

40. pH of  $0.08 \text{ mol dm}^{-3}$  .....

$0.08 \text{ mol dm}^{-3}$   $\text{HOCl}$  .....

**Sol.** pH = 2.85

$$\therefore [\text{H}^+] = 10^{-2.85} = 10^{-3} \times 10^{0.15} = 1.41 \times 10^{-3}$$

$$\text{Now, } [\text{H}^+] = \sqrt{K_a \cdot C}$$

$$1.41 \times 10^{-3} = \sqrt{K_a \times 0.08}$$

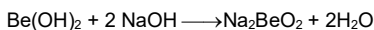
$$K_a = 2.48 \times 10^{-5} = 2.5 \times 10^{-5}$$

41. Which of the following .....

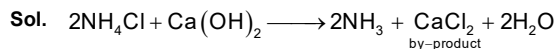
**Sol.** 'Li' is least reactive as it has high ionisation energy and high heat of atomisation.

42. Which of the following .....

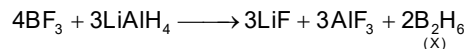
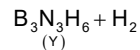
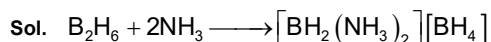
**Sol.**  $\text{Be}(\text{OH})_2$  is soluble in  $\text{NaOH}$



43. In the synthesis of .....



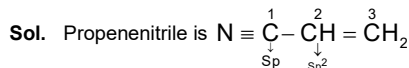
44. A compound 'X' .....



45. The most commonly .....

**Sol.**  $\text{SnCl}_4$  is more stable than  $\text{SnCl}_2$ . Hence  $\text{SnCl}_2$  can be oxidised thus it acts as a reducing agent.

46. The bond between .....



48. Which of the following .....

**Sol.** It has carbon atoms violating octet.

49. Hyperconjugation .....

**Sol.** In hyperconjugation,  $\sigma$ -electrons are delocalised into p-orbital of  $\alpha$ -carbon involved in  $\pi$ -bonding

50. Arrange the following .....

**Sol.** II is stabilised by the +m effect, most stable followed by I which is stabilised by +I and HC. IV is least stable due to -I, -m effect.

51. In the following .....



$$t=0 \quad 1 \quad 0 \quad 0$$

$$t=\text{eq} \quad 1-x \quad x \quad x$$

$$\frac{p}{d} = 1 + x = 1.4 \Rightarrow x = 0.4$$

$$[\text{COCl}_2] = \frac{1-x}{1} = 0.6 \text{ mol dm}^{-3}$$

$$[\text{CO}] = [\text{Cl}_2] = \frac{x}{1} = 0.4 \text{ mol dm}^{-3}$$

$$\text{Thus } K_c = \frac{[\text{CO}][\text{Cl}_2]}{[\text{COCl}_2]} = \frac{0.4 \times 0.4}{0.6} = 0.267$$

52. An insulated container .....

**Sol.** Since container is insulated

$\therefore q$  is 0. expansion is free thus

$$w = 0$$

$\therefore$  from 1st law of thermodynamics

$$\Delta U = q + w = 0 \text{ as } q = 0, w = 0$$

& T is function of  $\Delta U$  thus temperature remain constant

53. Degree of hydrolysis .....

$$\text{Sol. } \frac{h_1}{h_2} = \sqrt{\frac{C_2}{C_1}} \rightarrow \frac{0.1}{h_2} = \sqrt{\frac{0.01}{0.25}}$$

$$\Rightarrow h = 0.5 = 50\%$$

54. What will be the  $K_b$  .....



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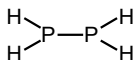
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**Sol.**  $\text{pH} = 8 \therefore \text{pOH} = 14 - 8 = 6$   
 At half neutralisation  $\text{pOH} = \text{p}K_b$   
 $\therefore \text{p}K_b = 6$   
 $\therefore K_b = 10^{-6}$

**55.** The heat of atomization .....

**Sol.** Bond dissociation energy of  $\text{PH}_3(\text{g}) = 228 \text{ kcal mol}^{-1}$

$$\text{P-H bond energy} = \frac{228}{3} = 76 \text{ kcal mol}^{-1}$$



$$\text{Bond energy of } 4(\text{P-H}) + (\text{P-P}) = 355$$

$$\Rightarrow 4 \times 76 + (\text{P-P}) = 355$$

$$\therefore \text{P-P bond energy} = 51 \text{ kcal mol}^{-1}$$

**56.** Among the following.....

**Sol.** The smallest ion ( $\text{Li}^+$ ) is least mobile, because it forms big clusters of ions in water.

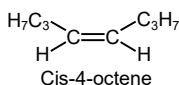
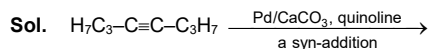
**57.** Which of the following .....

**Sol.** The heat of formation of graphite is zero at standard condition which is less than diamond

**58.** Which of the following .....

**Sol.** Due to back bonding Nitrogen does not have lone pair of electrons therefore the molecule is not a donor.

**59.** The reduction of 4-octyne .....



**60.** Which of the following .....



Hydrogen atom attached to  $\text{sp}$  hybridised carbon atom is acidic.

### PART-C (MATHEMATICS)

**61.** Length.....

**Sol.** Distance of focal chord from  $(0, 0)$  is  $p$

$$\text{equation of chord ; } 2x - (t_1 + t_2)y + 2at_1t_2 = 0$$

$$2x - (t_1 + t_2)y - 2a = 0 \quad \dots (i)$$

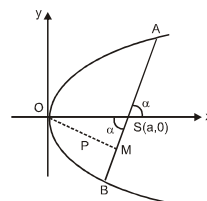
so perpendicular length from  $(0, 0)$

$$\left| \frac{2a}{\sqrt{4 + \left(t_1 - \frac{1}{t_1}\right)^2}} \right| = p \Rightarrow \left| \frac{2a}{\left(t_1 + \frac{1}{t_1}\right)} \right| = p$$

$$\Rightarrow \left( t_1 + \frac{1}{t_1} \right) = \frac{2a}{p}$$

$$\text{Now length of focal chord is} = a \left( t_1 + \frac{1}{t_1} \right)^2$$

$$= a \frac{4a^2}{p^2} = \frac{4a^3}{p^2}$$



**62.** Which of.....

**Sol.** Component statements are (i) 100 is divisible by 5  
 (ii) 100 is divisible by 10 (iii) 100 is divisible by 11

**63.** The line.....

**Sol.** Given equation of line and parabola are

$$y = mx + 1 \quad \dots (i)$$

$$y^2 = 4x \quad \dots (ii)$$

substituting value of  $y$  in (ii),

$$\text{we get} \quad (mx + 1)^2 = 4x$$

$$\text{or} \quad m^2x^2 + 1 + 2mx = 4x$$

$$\text{or} \quad m^2x^2 + 2x(m-2) + 1 = 0$$

$$\text{or} \quad m^2x^2 + 2x(m-2) + 1 = 0$$

$$\text{For tangent, } b^2 - 4ac = 0$$

$$\text{or} \quad [2(m-2)]^2 - 4 \times m^2 \times 1 = 0$$

$$\text{or} \quad 4(m-2)^2 - 4m^2 = 0$$

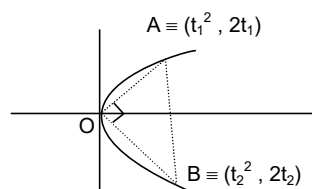
$$\text{or} \quad 4m^2 + 16 - 16m - 4m^2 = 0$$

$$\text{or} \quad 16 - 16m = 0$$

$$\text{or} \quad m = \frac{16}{16} = 1$$

**64.** A variable.....

**Sol.**



$$t_1t_2 = -4$$

$$h = \frac{t_1^2 + t_2^2}{3}, \quad k = \frac{2t_1 + 2t_2}{3}$$

$$3h = (t_1 + t_2)^2 + 8$$

$$3h = \frac{9k^2}{4} + 8$$

$$\Rightarrow y^2 = \frac{1}{9}(12x - 32)$$

$$\Rightarrow y^2 = \frac{4}{3}\left(x - \frac{8}{3}\right)$$

65. If a focal.....

Sol. Length of focal chord =  $16a \operatorname{cosec}^2 \alpha$

$$\text{For minimum length } \alpha = \frac{\pi}{4}$$

$$\text{minimum length} = 32a$$

66. If the.....

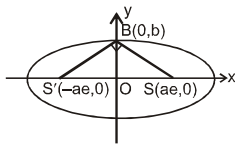
Sol.  $\frac{b}{-ae} \times \frac{b}{ae} = -1$

$$b^2 = a^2 e^2$$

$$a^2(1 - e^2) = a^2 e^2$$

$$2e^2 = 1$$

$$e = \frac{1}{\sqrt{2}}$$



67. In how.....

Sol. Total number of ways =  $2! \times 5! \times 5!$

68. The number.....

Sol. Number of triangle =  ${}^{10}C_3 - {}^5C_3 = 110$

69. The total.....

Sol. PRMTRAAEE

$$\Rightarrow \frac{5!}{2! 2!} \times \frac{5!}{2!} = 1800$$

70. The length .....

Sol.  $a^2 = \frac{1}{8}, b^2 = \frac{1}{4}$  length of L.R. =  $\frac{2a^2}{b} =$

$$\frac{2(1/8)}{1/2} = \frac{1}{2}$$

71. A ray .....

Sol.  $y^2 = 8x$

$$Q(4, k)$$

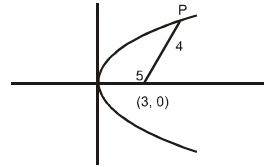
$$k^2 = 32$$

$$k = 4\sqrt{2}$$

$$\therefore \text{reflected ray is } y = 4\sqrt{2}$$

72. The point .....

Sol.



Let the point P is  $(3t^2, 6t)$

$$\text{and } PS = 3 + 3t^2 = 4$$

$$t^2 = 1/3$$

$$t = \pm \frac{1}{\sqrt{3}}$$

$\therefore$  Points are

$$(1, 2\sqrt{3}) \text{ \& } (1, -2\sqrt{3})$$

73. The equation.....

Sol.  $2b = 2ae \Rightarrow b = ae$

$$\frac{2b^2}{a} = 10 \Rightarrow b^2 = 5a \quad e^2 = 1 - \frac{b^2}{a^2}$$

$$e^2 = 1 - e^2$$

$$\Rightarrow e = \frac{1}{\sqrt{2}} \quad \frac{b}{a} = \frac{1}{\sqrt{2}}$$

$$\frac{b}{a} = \frac{5}{b} = \frac{1}{\sqrt{2}}$$

$$\Rightarrow b = 5\sqrt{2}$$

$$\frac{b}{a} = \frac{1}{\sqrt{2}}$$

$$\Rightarrow a = 10$$

Ellipse

$$\Rightarrow \frac{x^2}{100} + \frac{y^2}{50} = 1$$

$$\Rightarrow x^2 + 2y^2 = 100$$

74. STATEMENT - 1 .....

Sol.  $S_1$  : Number of different terms in expression of  $(a + b + c + d)^{12}$  is  ${}^{12+4-1}C_{4-1} = {}^{15}C_3$

$S_2$  :  $n$  distinguishable objects can be distributed in  $p^n$  ways to ' $p$ ' persons.

Statement-1 is true, statement - 2 is False.

75. In how.....

Sol. The possible arrangement is



but since mangoes are identical so they can be arranged in only 1 ways and other three fruits can be arranged in 3!

ways

$$\text{hence total arrangements are} = 1 \times 3! = 6$$

76. Length of.....

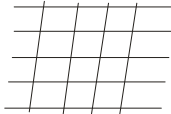
**Sol.**  $(x - 2)^2 + (y - 3)^2 = \left| \frac{3x - 4y + 7}{5} \right|^2$   
 $\therefore$  focus is (2, 3) & directrix is  $3x - 4y + 7 = 0$   
 latus rectum =  $2 \times \perp_r$  distance from focus to  
 directrix =  $2 \times \frac{1}{5} = 2/5$

77. The equation.....

**Sol.** The foci of an ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  is  
 given by  $(\pm ae, 0)$   
 Since,  $e = \frac{1}{2}$ ,  $ae = 2$   
 $\Rightarrow a = 4$   
 $\therefore b^2 = a^2(1 - e^2) = 16 \left(1 - \frac{1}{4}\right) = 12$   
 Hence, the equation of an ellipse is  $\frac{x^2}{16} + \frac{y^2}{12} = 1$ .

78. If 5 parallel.....

**Sol.** Number of parallelograms =  ${}^5C_2 \times {}^4C_2$   
 = 60



79. If the .....

**Sol.**  $\frac{a}{e} - ae = 8$   
 $a \left[ 2 - \frac{1}{2} \right] = 8$   
 $\frac{3}{2}a = 8$   
 $\Rightarrow a = \frac{16}{3} \therefore b^2 = a^2(1 - e^2)$   
 $\therefore b^2 = \left(\frac{16}{3}\right)^2 \left(1 - \frac{1}{4}\right)$   
 $\Rightarrow b^2 = \frac{64}{3} \Rightarrow b = \frac{8}{\sqrt{3}}$

80. If the equation .....

**Sol.** For ellipse  
 $8 - a > 0$  &  $a - 2 > 0$ ,  $8 - a \neq a - 2$   
 $2 < a < 8$ ,  $a \neq 5 \Rightarrow a \in (2, 8) - \{5\}$

81. A chord is .....

**Sol.**  $\therefore y^2 = 6x$  .....(1)  
 $\therefore$  focus is  $\left(\frac{3}{2}, 0\right)$   
 $\therefore$  line passing through  $\left(\frac{3}{2}, 0\right)$  is  $y = m \left(x - \frac{3}{2}\right)$   
 $\Rightarrow mx - y - \frac{3m}{2} = 0$   
 $\Rightarrow \left| \frac{\frac{3m}{2}}{\sqrt{m^2 + 1}} \right| = \frac{\sqrt{5}}{2}$   
 $\Rightarrow 9m^2 = 5m^2 + 5$   
 $\Rightarrow 4m^2 = 5$   
 $\Rightarrow m = \pm \frac{\sqrt{5}}{2}$

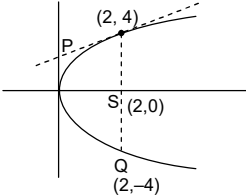
82. The number.....

**Sol.** Number of one digit numbers = 9  
 Number of 2 digits numbers =  $9 \times 9 = 81$   
 Number of 3 digits numbers =  $9 \times 9 \times 8 = 648$   
 total numbers =  $9 + 81 + 648 = 738$

83. In How many.....

**Sol.** 6 Players are surely to be included and 4 players are certainly not included. So, we have to select only 4 out of the remaining  $22 - 6 - 4 = 12$  players, which can be done in  ${}^{12}C_4$  ways

84. If P is a.....

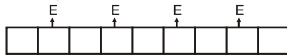
**Sol.**   
 Tangent at P  
 $x - y + 2 = 0$   
 image of Q  
 $\frac{x - 2}{1} = \frac{y + 4}{-1} = \frac{-2(2 + 4 + 2)}{2} = -8$   
 $\Rightarrow x = -6$   $y = 4$

85. The number .....

**Sol.** Number of four digit no. in which atleast one digit is repeated (i.e. all digit are not different) is  
 $\begin{array}{|c|c|c|c|} \hline 9 & 10 & 10 & 10 \\ \hline \end{array} - \begin{array}{|c|c|c|c|} \hline 9 & 9 & 8 & 7 \\ \hline \end{array}$   
 =  $9000 - 4536 = 4464$

86. How many .....

Sol. Even place



There are four even places and four odd digit number so total number of filling is  $\frac{4!}{2!.2!}$  rest are also occupy in

$$\frac{5!}{3!.2!} \text{ ways}$$

$$\text{Hence total number of ways} = \frac{4!}{2!.2!} \times \frac{5!}{3!.2!} = 60$$

87. 8 chairs .....

Sol. Total number of possible arrangements is

$$4p_2 \times 6p_3 .$$

88. The .....

Sol. NINETEEN

$$\Rightarrow N \rightarrow 3 : I, T$$

$$E \rightarrow 3$$

First we arrange the word of N, N, N, I and T

$$\text{then the number of ways} = \frac{5!}{3!} .$$

Now total 6 number of place which are arrange E is  ${}^6C_3$

$$\text{Hence total number of ways} = \frac{5!}{3!} \cdot {}^6C_3$$

89. The number .....

Sol. In the given words, N is repeated twice, C is repeated thrice and E is repeated thice. When 3 E's are kept together, then we have eight letters C, C, S, P, U, Q, N, N and a packet of E's which can be permuted in

$$\frac{|9|}{|2| |2|} \text{ ways.}$$

**DATE : 04-02-2018**

**COURSE : ABHINAV (EA) & AADHAAR (EB)**

**ANSWER KEY**

**CODE-0**

**PART-A (PHYSICS)**

- |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1.  | (3) | 2.  | (2) | 3.  | (4) | 4.  | (3) | 5.  | (3) | 6.  | (4) | 7.  | (3) |
| 8.  | (3) | 9.  | (3) | 10. | (1) | 11. | (3) | 12. | (2) | 13. | (4) | 14. | (1) |
| 15. | (2) | 16. | (1) | 17. | (3) | 18. | (2) | 19. | (3) | 20. | (2) | 21. | (1) |
| 22. | (1) | 23. | (3) | 24. | (4) | 25. | (1) | 26. | (1) | 27. | (4) | 28. | (2) |
| 29. | (5) | 30. | (1) |     |     |     |     |     |     |     |     |     |     |

**PART-B (CHEMISTRY)**

- |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 31. | (2) | 32. | (4) | 33. | (3) | 34. | (2) | 35. | (4) | 36. | (1) | 37. | (2) |
| 38. | (4) | 39. | (2) | 40. | (2) | 41. | (1) | 42. | (1) | 43. | (1) | 44. | (1) |
| 45. | (4) | 46. | (4) | 47. | (4) | 48. | (3) | 49. | (4) | 50. | (4) | 51. | (1) |
| 52. | (1) | 53. | (4) | 54. | (3) | 55. | (2) | 56. | (3) | 57. | (1) | 58. | (3) |
| 59. | (2) | 60. | (5) |     |     |     |     |     |     |     |     |     |     |

**PART-C (MATHEMATICS)**

- |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 61. | (3) | 62. | (3) | 63. | (1) | 64. | (2) | 65. | (4) | 66. | (2) | 67. | (1) |
| 68. | (3) | 69. | (3) | 70. | (1) | 71. | (2) | 72. | (2) | 73. | (4) | 74. | (3) |
| 75. | (4) | 76. | (4) | 77. | (2) | 78. | (2) | 79. | (1) | 80. | (4) | 81. | (2) |
| 82. | (1) | 83. | (3) | 84. | (2) | 85. | (2) | 86. | (4) | 87. | (4) | 88. | (3) |
| 89. | (4) | 90. | (3) |     |     |     |     |     |     |     |     |     |     |