1. Since the words start as well as end with *T,* number of such words $=\dfrac{9!}{2!2!}=90720$ **Choice (B)**

2. Given that $A-B=\dfrac{\pi}{4}$

$\Rightarrow \tan(A-B)=\tan\dfrac{\pi}{4}$

$\Rightarrow \dfrac{\tan A-\tan B}{1+\tan A\tan B}=1$

$\Rightarrow \tan A - \tan B = 1 + \tan A \tan B$

$\Rightarrow \tan A - \tan B - \tan A \tan B = 1$

Adding 1 on both sides

$(1+ \tan A) - \tan B(1 + \tan A) = 2$

$(1+ \tan A)(1- \tan B) = 2$ **Choice (A)**

3. $P(A \cup B) = P(a) + P(B) - P(A\cap B)$

$1 = 1+\dfrac{1}{2}-P(A\cap B)$

$P(A\cap B) = \dfrac{1}{2}$

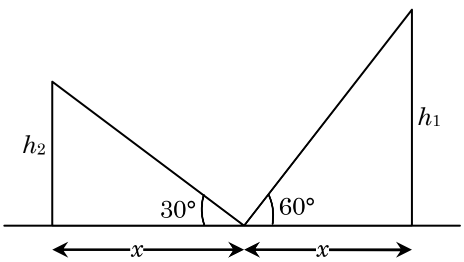
$P(A/B) = \dfrac{P(A\cap B)}{P(B)}=\dfrac{\frac{1}{2}}{\frac{1}{2}}=1$

$P(B/A) = \dfrac{P(B\cap A)}{P(A)}=\dfrac{1/2}{1}=\dfrac{1}{2}$ **Choice (D)**

4. When digits and letters can repeat then number of license plates = $26^3\times10^4$ **Choice (A)**

5. We know that 1 radian is approximately 57°. Clearly sin 1 > sin 1°. **Choice (B)**

6. Heights of the two buildings are h_1 and h_2



$\dfrac{h_1}{x}=\sqrt{3} \Rightarrow x=\dfrac{h_1}{\sqrt{3}}$

$\dfrac{h_2}{x}=\dfrac{1}{\sqrt{3}} \Rightarrow x = \sqrt{3}h_2$

$\dfrac{h_1}{\sqrt{3}}=\sqrt{3}h_2 \Rightarrow \dfrac{h_1}{h_2}=\dfrac{3}{1}$ **Choice (D)**

7. Dot product of the two vectors must be zero, hence

$x + 3x + 8 = 0 \Rightarrow 4x + 8 = 0 \Rightarrow x = -2$ **Choice (A)**

8. Since the function is continuous, hence

L.H.L. = R.H.L.

$\lim\limits_{h\to0}\sin\left(\dfrac{\pi}{2}-h\right)=\lim\limits_{h\to0}a\left(\dfrac{\pi}{2}+h\right)$

$1 = a.\dfrac{\pi}{2} \Rightarrow a = \dfrac{2}{\pi}$ **Choice (C)**

9. $x+\dfrac{1}{x}$ will be minimum when $x = 1$. Note that this is true only for positive numbers **Choice (C)**

10. Given that $\cos(\alpha+\beta)=\dfrac{4}{5}$ and $\sin(\alpha-\beta)=\dfrac{5}{13}$

Thus $\tan(\alpha+\beta)=\dfrac{1}{4}$ and $\tan(\alpha-\beta)=\dfrac{5}{12}$

Now $\tan 2\alpha = \tan((\alpha+\beta)+(\alpha-\beta))$

$=\dfrac{\tan(\alpha+\beta)+\tan(\alpha-\beta)}{1-\tan(\alpha+\beta)\tan(\alpha-\beta)}$

$=\dfrac{\frac{3}{4}+\frac{5}{12}}{1-\frac{3}{4}\times\frac{5}{12}}=\dfrac{\frac{27+15}{36}}{1-\frac{5}{16}}=\dfrac{\frac{42}{36}}{\frac{11}{16}}=\dfrac{56}{33}$ **Choice (A)**

11. r^{th} term of the given series is

$\sin\left(\dfrac{r\pi}{n}\right)\dfrac{\pi}{n}$

Sum of the series is given by $\sum\limits_{r=1}^{n-1}\dfrac{\pi}{n}\sin\left(\dfrac{r\pi}{n}\right)$

Putting $\dfrac{r}{n}=x \Rightarrow \dfrac{1}{n}=dx$

Thus the sum is $\int\limits_0^1 \pi\sin(\pi x)dx = 2.$ **Choice (C)**

12. Suppose the required point is (x_1, y_1)

$\dfrac{dy}{dx}=6-2x$

$6 - 2x_1 = 0 \Rightarrow 2x_1 = 6 \Rightarrow x_1 = 3$

Point must lie on the curve

$\Rightarrow y_1=6x_1-x_1^2$

Putting $x_1 = 3$, $y_1=18-9=9$, the point is (3, 9). **Choice (D)**

13. When $0 < x < 1$, $2^{x^3}<2^{x^2}$, hence $I_2 < I_1$.

Again when $1 < x < 2$, $2^{x^3}>2^{x^2}$, thus $I_4 > I_3$. **Choice (D)**

14. $I=\int\limits_0^{\pi/2}\log\tan x\,dx$ (i)

Using property $\int_0^a f(x)dx = \int_0^a f(a-x)dx$

$$I = \int_0^{\pi/2} \log\tan\left(\frac{\pi}{2}-x\right)dx$$

$$I = \int_0^{\pi/2} \log\cot x dx \qquad \text{(ii)}$$

Adding (i) & (ii)

$2I = 0 \Rightarrow I = 0$ **Choice (D)**

15. Total number of determinants of order 2×2, which can be formed by using 1 and 0 only is 2×2×2×2= 16

Non zero determinants are

$$\begin{vmatrix}1 & 0\\0 & 1\end{vmatrix}, \begin{vmatrix}1 & 0\\1 & 1\end{vmatrix}, \begin{vmatrix}1 & 1\\0 & 1\end{vmatrix},$$

$$\begin{vmatrix}0 & 1\\1 & 0\end{vmatrix}, \begin{vmatrix}1 & 1\\1 & 0\end{vmatrix}, \begin{vmatrix}0 & 1\\1 & 1\end{vmatrix}$$

Required probability is $\frac{6}{16} = \frac{3}{8}$ **Choice (B)**

16. The question seems to be wrong because if we take $\sin^2 x = 1-x$, then x should be around 30° - 40°, then none of the choices will be correct.

Question should be $\sin^2 x = 1-\sin x$

$\Rightarrow 1-\cos^2 x = 1-\sin x \Rightarrow \cos^2 x = \sin x$

Squaring it again we get the answer

$\cos^4 x = 1-\cos^2 x \Rightarrow \cos^4 x + \cos^2 x = 1$.

Choice (B)

17. Equation of the plane passing through (1, 2, 3) and having the vector $\overline{N} = 3i - j + 2k$ as its normal is

$\Rightarrow 3(x-1) + -1(y-2) + 2(z-3) = 0$

$\Rightarrow 3x - y + 2z - 3 + 2 - 6 = 0$

$3x - y + 2z = 7$ **Choice (C)**

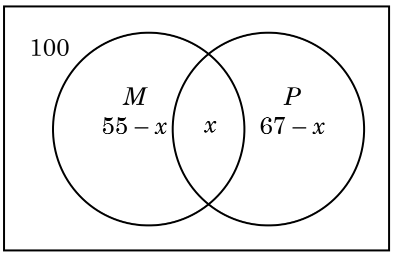
18. Question seems to be wrong as $5t < 1$, so that $t < 0.2$, thus $\sin^2 x < 0.2$ and $\cos^2 x < 0.2$ which is not possible simultaneously.

19. Total number of cases is 8.

a, b, c can take values 1 and 2 only. The roots are real when $b = 2$, a and c are 1, 1.

Required probability = $1-\frac{1}{8} = \frac{7}{8}$. **Choice (A)**

20.



$55 - x + x + 67 - x = 0$

x = 182 – 100 = 22

Students who have passed only in physics = 67 – 22 = 45 **Choice (D)**

21. P, H, Q are in $H.P.$

$\frac{1}{P}, \frac{1}{H}, \frac{1}{Q}$ are in $A.P.$

$\frac{2}{H} = \frac{1}{P} + \frac{1}{Q} \Rightarrow 2 = \frac{H}{P} + \frac{H}{Q}$ **Choice (A)**

22. The given equations have many solutions if

$$\frac{k+1}{k} = \frac{8}{k+3} = \frac{4k}{3k-1}$$

Taking equations in pairs, we have these values, k = 1, 3, 2.

Out of these only k = 1 satisfies all the conditions.

Choice (B)

23. Using this formula ${}^nC_r + {}^nC_{r-1} = {}^{n+1}C_r$

${}^{20}C_8 + {}^{20}C_9 + {}^{21}C_{10} + {}^{22}C_{11} - {}^{23}C_{11}$

${}^{21}C_9 + {}^{21}C_{10} + {}^{22}C_{11} - {}^{23}C_{23}$

${}^{22}C_{10} + {}^{22}C_{11} - {}^{23}C_{11}$

${}^{23}C_{11} - {}^{23}C_{11} = 0$ **Choice (C)**

24. The given question can be written as

$$\tan^{-1}\left(\frac{1}{21}\right) + \tan^{-1}\left(\frac{1}{13}\right) + \tan^{-1}\left(-\frac{1}{8}\right)$$

$$= \tan^{-1}\left[\frac{\frac{1}{21}+\frac{1}{13}}{1-\frac{1}{21}\times\frac{1}{13}}\right] + \tan^{-1}\left[-\frac{1}{8}\right]$$

$$= \tan^{-1}\left[\frac{34}{272}\right] + \tan^{-1}\left[-\frac{1}{8}\right]$$

$= \tan^{-1}\left[\frac{1}{8}\right] + \tan^{-1}\left[-\frac{1}{8}\right] = 0.$ **Choice (A)**

25. $y = x^3 - 3x + 2$

On differentiating

$\frac{dy}{dx} = 3x^2 - 3 \Rightarrow \frac{dy}{dx} = 12 - 3 = 9$

Slope of normal = $-\frac{1}{9}$

Equation of normal at (2, 4) is $y - 4 = -\frac{1}{9}(x-2)$

$9y - 36 = -x + 2 \Rightarrow x + 9y = 38$ **Choice (C)**

26. $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(C) = \frac{1}{4}$

Problem will be solved if any one of them can solve the problem

$\therefore P(A \cup B \cup C) = 1 - P(\overline{A}) + P(\overline{B}) + P(\overline{C})$

$= 1 - \frac{1}{2}\times\frac{1}{4}\times\frac{3}{4} = 1 - \frac{1}{4} = \frac{3}{4}$ **Choice (D)**

27. $f(x) = x^x$

$f'(x) = x^x(1 + \log x)$

for decreasing function

$f'(x) < 0 \Rightarrow x^x(1 + \log x) < 0$

$\Rightarrow 1 + \log x < 0 \Rightarrow \log x < -1$

$\Rightarrow x < e^{-1}$ and x > 0 interval is $\left(0\ \frac{1}{e}\right)$ **Choice (C)**

28. $\vec{a} + \vec{b} = -\vec{c}$

Squaring both the sides

$|\vec{a}|^2 + |\vec{b}|^2 + 2\vec{a}.\vec{b} = |\vec{c}|^2$

$9 + 25 + 2.\ |\vec{a}|.|\vec{b}|.\cos\theta = |\vec{c}|^2$

$34 + 2.3.5.\cos\theta = 49$

$30.\cos\theta = 15 \Rightarrow \cos\theta = \frac{15}{30} = \frac{1}{2} = \cos 60°$

$\Rightarrow \theta = 60°$ **Choice (b)**

29. We know that $\frac{|\vec{a}\times\vec{b}|}{\vec{a}\bullet\vec{b}} = \frac{|\vec{a}|\,|\vec{b}|\sin\theta}{|\vec{a}|\,|\vec{b}|\cos\theta} = \tan\theta$

Choice (B)

30. Given that $f(a+b) = f(a).f(b)$

Putting $a = b = 0$, we have $f(0 + 0) = f(0)\times f(0)$

$\Rightarrow f(0) = 1$ or 0

Now $f'(0) = \lim_{h\to 0}\left[\frac{f(0+h) - f(0)}{h}\right]$

$\lim_{h\to 0}\left[\frac{f(0).f(h) - f(0)}{h}\right] = f(0)\lim_{h\to 0}\left[\frac{f(h)-1}{h}\right]$

Since $f'(0) = 3$, hence $f(0)$ cannot be 0, thus $f(0) = 1$.

$\Rightarrow f(0)\lim_{h\to 0}\left[\frac{f(h)-1}{h}\right] = 3$ or $\lim_{h\to 0}\left[\frac{f(h)-1}{h}\right] = 3$

Now $f'(5) = \lim_{h\to 0}\left[\frac{f(5+h) - f(5)}{h}\right]$

$= f(5)\lim_{h\to 0}\left[\frac{f(h)-1}{h}\right] = 2\times 3 = 6.$ **Choice (C)**

31. Suppose the third vertex is (x, y), then according to the given condition

$\frac{x+4-9}{3} = 1$ and $\frac{y-3+7}{3} = 4$

$\Rightarrow x, y = (8, 8)$

Hence area of the triangle is

$\frac{1}{2}[4\times 7 + (-9\times 8) + (8\times -3) - (-9\times -3) - 8\times 7 - 4\times 8]$

$= \frac{183}{2}$. **Choice (C)**

32. Suppose the equation of the ellipse is $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, since the ellipse passes through the points (4, 3) and (– 1, 4), thus

$\frac{16}{a^2} + \frac{9}{b^2} = 1$ and $\frac{1}{a^2} + \frac{16}{b^2} = 1$

Suppose $\frac{1}{a^2} = A$ and $\frac{1}{b^2} = B$, then the equations become,

$16A + 9B = 1$ and $A + 16B = 1$

Solving these equations $A = \frac{7}{247}$ and $B = \frac{15}{247}$.

Equation of the ellipse is $7x^2 + 15y^2 = 247$.

The same result can be obtained by putting the given points in the four choices **Choice (B)**

33. Radius of first circle is $\sqrt{1^2 + k^2 - 6} = \sqrt{k^2 - 5}$

Radius of second circle = $\sqrt{k^2 - k}$

Distance between their centres

$= \sqrt{(-1-0)^2 + (k-k)^2} = 1$

Circles are cutting orthogonally if

$(k^2 - 5) + (k^2 - k) = 1 \Rightarrow 2k^2 - k - 6 = 0$

$\Rightarrow (2k + 3)(k - 2) = 0$ or $k = -\frac{3}{2}$ *or* 2 **Choice (A)**

34. Equation can be written as $(x - y)^2 = 4(x + y - 1)$

Suppose $(x - y) = Y$ and $(x + y - 1) = X$, then equation becomes

$Y^2 = 4X$, whose focus will be (1,0).

Thus $X = 1$ and $Y = 0$

Or $x + y - 1 = 1$ and $x - y = 0$

$\Rightarrow x = 1, y = 1$ **Choice (A)**

35. Given that $\bar{a} + \bar{b} + \bar{c} = 0$

Squaring both the sides

$|\bar{a}|^2 + |\bar{b}|^2 + |\bar{c}|^2 + 2\bar{a}.\bar{b} + 2\bar{b}.\bar{c} + 2\bar{a}.\bar{c} = 0$

$\Rightarrow \bar{a}.\bar{b} + \bar{b}.\bar{c} + \bar{c}.\bar{a} = -\frac{3}{2}$ **Choice (D)**

36. Vectors are no coplanar if

$$\begin{vmatrix} 1 & 2 & 3 \\ 0 & \lambda & 4 \\ 0 & 0 & 2\lambda - 1 \end{vmatrix} \neq 0$$

$\Rightarrow (2\lambda - 1)(\lambda) \neq 0 \Rightarrow \lambda \neq \frac{1}{2}$ and $\lambda \neq 0$ **Choice (C)**

37. **Choice (A)**

38. Let us check determinant of coefficients.

$$\begin{vmatrix} 1 & \omega^2 & \omega \\ \omega & 1 & \omega^2 \\ \omega^2 & \omega & 1 \end{vmatrix} = \begin{vmatrix} 1+\omega+\omega^2 & \omega^2 & \omega \\ 1+\omega+\omega^2 & 1 & \omega^2 \\ 1+\omega+\omega^2 & \omega & 1 \end{vmatrix} = 0$$

Hence there are many solutions. **Choice (B)**

39. $1 + x = \log_a a + \log_a bc = \log_a abc$

$1 + y = \log_b abc$

$1 + z = \log_c abc$, then $\frac{1}{1+x} + \frac{1}{1+y} + \frac{1}{1+z}$

$= \log_{abc} a + \log_{abc} b + \log_{abc} c = 1.$ **Choice (C)**

40. $2^a = 3^b = 6^{-c} = k(say)$

$\Rightarrow 2 = k^{\frac{1}{a}}$, $3 = k^{\frac{1}{b}}$ and $k^{-\frac{1}{c}}$

As 2×3 = 6 or $k^{\frac{1}{a}}.k^{\frac{1}{b}} = k^{-\frac{1}{c}}$

or $\frac{1}{a} + \frac{1}{b} = -\frac{1}{c}$

$\Rightarrow bc + ac = -ab$ or $ab + bc + ca = 0$ **Choice (c)**

41. $e^2 = \left(1 + \frac{b^2}{a^2}\right)$ and $e'^2 = \left(1 + \frac{a^2}{b^2}\right)$

Hence $\frac{1}{e^2} + \frac{1}{e'^2} = 1$ **Choice (b)**

42. Total number of cases = 2^n

Number of cases when head comes odd numbers of times = ${}^nC_1 + {}^nC_3 + {}^nC_5 + ... = 2^{n-1}$

Required probability = $\frac{2^{n-1}}{2^n} = \frac{1}{2}.$ **Choice (a)**

43. Given that sin (π cos θ) = cos (π sin θ)

$\Rightarrow$ sin (π cos θ) = $\sin\left(\frac{\pi}{2} \pm \pi \sin\theta\right)$

$\Rightarrow \pi \cos\theta = \frac{\pi}{2} \pm \pi \sin\theta$

$\Rightarrow \cos\theta \mp \sin\theta = \frac{1}{2}$

or $\cos^2\theta + \sin^2\theta \pm 2\sin\theta\cos\theta = \frac{1}{4}$

or $\pm \sin 2\theta = -\frac{3}{4} \Rightarrow \sin 2\theta = \pm\frac{3}{4}$ **Choice (d)**

44. Number of diagonals in a polygon = ${}^nC_2 - n = n$

$\Rightarrow {}^nC_2 = 2n$

$\Rightarrow \frac{n(n1)}{2} = 2n$ or $n = 5$. Thus the polygon is a pentagon. **Choice (a)**

45. According to the given condition,

${}^{100}C_{50}(p)^{50}(1-p)^{50} = {}^{100}C_{51}(p)^{51}(1-p)^{49}$

$\frac{100!}{50!50!}(1-p) = \frac{100!}{51!49!}.p$

$\frac{1-p}{50} = \frac{p}{51} \Rightarrow 51 - 51p = 50p$

or $p = \frac{51}{101}$ **Choice (d)**

46. To obtain real roots,

$(\cos p)^2 \geq 4(\cos p - 1)\sin p.$

$(\cos p)^2 - 4\cos p \sin p + 4\sin p \geq 0$

$\Rightarrow \cos^2 p - 4\cos p \sin p + 4\sin^2 p$

$+ 4\sin p - 4\sin^2 p \geq 0$

$\Rightarrow (\cos p - 2\sin p)^2 + 4(\sin p - \sin^2 p) \geq 0$

$(\cos p - 2\sin p)^2$ is always + ve. $(\sin p - \sin^2 p)$ is also positive, where $< p < \pi$, it can be shown that when p lies in III or IV quadrants, $(\sin p - \sin^2 p)$ becomes negative. **Choice (D)**

47. Suppose f(x) = $3x^5 + 15x - 8$

Number of sign changes in $f(x) = 0$ is only 1, hence there can be maximum one positive root of $f(x) = 0$.

Number of sign changes in $f(-x) = 0$ is none. Thus there is no negative root. But degree of equation is 5, therefore, there is at least one real root. So there must be one real positive root. **Choice (C)**

48. To get non trivial solutions,

$$\begin{vmatrix} 3 & k & -2 \\ 1 & k & 3 \\ 2 & 3 & -4 \end{vmatrix} = 0$$

$\Rightarrow 3(-4k - 9) - k(-4 - 6) - 2(3 - 2k = 0)$

$\Rightarrow 2k - 33 = 0$ or $k = \frac{33}{2}.$ **Choice (D)**

49. $\log_3 5 = \log_{3^2} 5^2 = \log_9 25$

Clearly $\log_9 25 > \log_{17} 25$

Hence $x > y$ **Choice (A)**

50. $A^2 = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$

$A^4 = A^2 - A^2 = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}\begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$

By the same pattern $A^n = \begin{bmatrix} 1 & n \\ 0 & 1 \end{bmatrix}$ **Choice (B)**

51. Alphabets are coded alternately – 2 and + 2 ROAST (18 15 1 19 20) is coded as PQYUR (16 17 25 21 18). Hence SLOPPY (19 12 15 16 16 25) will be coded as (17 14 13 18 14 1) QNMRNA **Choice (C)**

52. Here Leli means Yellow and Froti means Garden and pleka means flower. So Yellow Flower means lelipleka. **Choice (B)**

53. Here 6–9+8*33/20 will be
6 + 9 × 8/3 – 20 = 6 + 24 – 20 = 10. **Choice (C)**

54. The first day of January has to be Tuesday only. So the 20th January has to be Sunday. **Choice (B)**

55. In choices A, B and D 'Q' is before 'U' where Q is greater than U. So only choice left is C **Choice (C)**

56. LCM of (16,24) is 48. Hence size of square can be 48. So only six tiles are required. **Choice (A)**

57. N is brother of K who is husband of L. So N is brother in law of L **Choice (D)**

58. Let the games won by B and C be x and y respectively. So losses of A will be x+y and of B will be y+3 and of C will be x+3. For B, 6x – 3(y+3)=– 3 For C, 6y – 3(x+3)=12 By adding these two equations we get x + y = 9. Hence total number of games will be x + y + 3 = 12. **Choice (A)**

59. Let the total distance be 'D' and time be 'T'

$$4(T+\frac{6}{60})=5(T-\frac{6}{60})$$

then $4T+\frac{2}{5}=5T-\frac{1}{2}$

$$T=\frac{9}{10}$$

Hence distance 'D' $=4(\frac{9}{10}+\frac{6}{60})=4$ km **Choice (A)**

60. Here we have two alternate series. 3, 6, 9, 12 and 6, 12, _.So next number will be 18 **Choice (C)**

61. A man starts running towards east and then turns right(South) then turns right(West), turns left(South), turns left(East) and again turns left(North). Hence he is finally facing North. **Choice (A)**

62. Let us take x number of male and y number of female.

$\frac{1}{2}(y-15)=x$

$5(x-45)=y$

$2x-y=-15$

$5x-y=225$

$\Rightarrow 3x=240$ or $x=80$

Hence number of males will be 80. **Choice (B)**

63. $6\xrightarrow{+6}12\xrightarrow{+9}21\xrightarrow{+12}33\xrightarrow{+15}48$

So next number is 33 **Choice (B)**

Solution for questions 64 to 66: If we arrange the given data in a table we get

	Task	Day
Randy	Vacuuming	Monday
Sally	Dusting	Tuesday
Terry	Sweeping	Wednesday
Uma	Mopping	Thursday
Vernon	Laundry	Friday

64. Choice (D)

65. Choice (B)

66. Choice (C)

67. The given series is n^3+1. Odd number is 216 whish is n^3 **Choice (B)**

68. Lets take number of students be N.

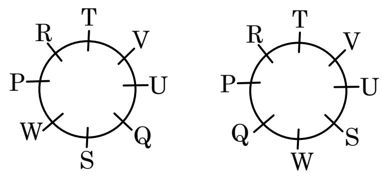
$$\frac{N\times 40+120\times 32}{N+120}=36$$

$40N + 3840 = 36N + 4320$

$4N = 480$ or $N = 120$

So the total number of students after joining new students is 120 + 120 = 240 **Choice (D)**

Solutions for 69 to 70: After considering all conditions in the direction here two cases are possible.



Case-1 Case-2

69. Choice (A)

70. Choice (D)

71. Only in choice (C), unit digit is 3 more then tens digit. **Choice (C)**

72. There will be only two faces adjacent to both 4 and 6. In given diagrams 1 and 5 both are adjacent to 4 and 6 hence 1 and 5 has to be opposite to each other. **Choice (C)**

73. Here the arrangement will be

<u>**B**</u> <u>**E**</u> <u>**G**</u> <u>**F**</u> <u>**D**</u> <u>**C**</u> <u>**A**</u>

So third from North if 'G'. **Choice (D)**

74. Possible diagram is

Grand father —— Grand mother
|
Son —— his wife
|
Grand Son

So , minimum number of members are five. **Choice (A)**

75. We can say A and C are male but we can not say anything about B and D so only choice (A) is definitely true. **Choice (A)**

Solution for 76 to 78:

76. The colour of B's roof and Chimney is Red and Black so the colour of Chimney of A and C can not be Red and Black so it has to be white. **Choice (C)**

77. If house C has a yellow roof then house D has red roof because house E has a green roof. Now the colour of chimney of D's house has to be black because colour of chimney of C's house is white and roof of D's house is Red. Hence the house E has white colour chimney. **Choice (A)**

78.

	A	*B*	*C*	*D*	*E*
Roof	Green	Red	Green	Yellow	Green
Chimney	White	Black	White	Blue	Red

Hence Maximum number of Green roofs can be 3. **Choice (C)**

79.

Mother
|
Krishna
|
Grand son ——— Wife (that girl)

So Krishna is father in law of that girl. **Choice (B)**

80. $l + b = \sqrt{l^2 + b^2} + l/2$

$\frac{l}{2} + b = \sqrt{l^2 + b^2}$

$\frac{l^2}{4} + b^2 + lb = l^2 + b^2$

$\frac{3}{4}l^2 = lb \Rightarrow \frac{b}{l} = \frac{3}{4}$ **Choice (D)**

81. $S\ \underline{N\ I}\ P$ (NICE) $P\ A\ \underline{C\ \ E}$

$T\ \underline{E\ A}\ R$ (EAST) $F\ A\ \underline{S\ T}$

$T\ \underline{R\ A}\ Y$ (RARE) $F\ I\ \underline{R\ \ E}$

$P\ \underline{O\ U}\ T$ (OURS) $C\ A\ \underline{R\ S}$

So from the same logic we can say

$C\ \underline{A\ N}\ E$ (Ants) $B\ A\ \underline{T\ S}$ **Choice (C)**

82. We can easily conclude that near sightedness is caused by visual stress required by reading and other class work. **Choice (C)**

Solution for 83 to 85:

83. If *A* occurs either *B* or *C* will occur but not both and if either *B* or *C* occurs. *D* must occur and if *D* occurs *G* or *H* or both occurs. But not out of *E* and *F* only one ca occur because if *E* occurs then *C* also occurs and if *F* occurs then *B* also occurs. And *B* and *C* an not occur together hence. Either *F* and *G* and *D* will occur or *E* and *H* and *D* will occur. **Choice (C)**

84. Choice (A)

85. If *J* occurs then either *E* or *F* occurs and if *E* occurs then *C* must occurs, if *F* occur then *B* must occur so we can say if *J* occurs either *B* or *C* will occur. **Choice (B)**

86. Only Choice (A) is not true. **Choice (A)**

87.

Mother
The lady — Only son (father)
|
Brother ——— The man

Hence the man is nephew of the lady. **Choice (D)**

Solution for 88 to 90: The arrangement will be

B < F < A < C < E < D

88. Choice (C)

89. Choice (D)

90. Choice (F)

91. The given situation describes an action that has just been completed. Technically, the correct expression should be 'has won'. But as it is a news headline the correct expression in this special case will be 'wins' instead of 'has won'. **Choice (B)**

92. In conditional sentences 'Had + third form of the given verb (V3)' is used to express unfulfilled conditions. Hence, the correct answer will be 'had known'. **Choice (C)**

93. The correct spelling of the given word is 'altogether'. Hence, choice (C) is the correct answer. **Choice(C)**

94. The grammatically correct usage is to 'drag (someone) into a controversy'. **Choice (B)**

95. The correct expression will be 'the people with whom you socialise'. **Choice (A)**

96. The given sentence relates to a past action. Hence, the right expression will be 'did you walk'. **Choice (A)**

97. As the given sentence is about a railway compartment the correct expression should be 'seat'. **Choice (C)**

98. The given sentence (though incomplete) wants to express that the advanced societies has caused more damage than the not so developed societies. Thus, only choice (C) completes what the given sentence wants to portray. **Choice (C)**

99. When we deal with two actions both of which are in the past, the action taking place earlier is placed in the past perfect tense and the one taking place later, is placed in the past indefinite tense. Here the action 'thief had escaped' took place earlier and the action; 'the police came' took place later. **Choice (B)**

100. When we deal with two actions, both of which are in the past, the action taking place earlier is placed in the past perfect tense and the one taking place later, is placed in the past indefinite tense. Here the action 'Peter had left' took place earlier and the action, 'Anne had to pay' took place later. **Choice (A)**

101. Choice (D)

102. Choice (D)

103. Choice (C)

104. Choice (D)

105. The word 'polemic' means 'of or involving dispute or controversy.' **Choice (D)**

106. Choice (A)

107. This sentence is about an unfulfilled condition. Thus, the right expression should be 'If you had come.' **Choice (A)**

108. Choice (B)

109. The expression ‘to eat a humble pie’ means to acknowledge ask for forgiveness for the mistake(s) you have made. **Choice (D)**

110. To ‘fabricate’ is to create/make something and to ‘dismantle’ is to take something apart. **Choice(C)**

111. Choice (C)

112. Choice (B)

113. Choice (B)

114. Choice (C)

115. Choice (A)

116. Choice (A)

117. Choice (A)

118. Choice (B)

119. A is a negative number and B is positive. A = –6 and B is 10.

Hence A×B = – 60. As we know that 60 = 0111100

Hence –60 will be 2’s complement of 60 = 11000100

Choice (A)

120. Choice (A)