SOLUTION "Numbering as on Code 9"

Q.41. four fair dice D_1, D_2, D_3, D_4 ----

$$\frac{6}{6}\cdot\frac{5}{6}\cdot\frac{4}{6}\cdot\frac{3}{6} + 3\left(\frac{6}{6}\cdot\frac{1}{6}\cdot\frac{5}{6}\cdot\frac{2}{6}\right) + \frac{6}{6}\cdot\frac{1}{6}\cdot\frac{1}{6}\cdot\frac{1}{6}$$

$$\frac{60 + 3\times 10 + 1}{216}$$

$36 \times 6 = 216$

Ans (A) = 91/216.

Q.42. If P is a 3x3 matrix such that ---

$P^T = 2P + I$.

SUHAG SHORT TRICK.

So Ans is D

let $P = \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ Same $\rightarrow$ $P^T = \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$

Q.43. Let $\alpha(a)$ & $\beta(a)$ be the roots.

$$\alpha+\beta = -\left(\frac{\sqrt{1+a}-1}{\sqrt[3]{1+a}-1}\right) \qquad \alpha\cdot\beta = \frac{\sqrt[6]{1+a}-1}{\sqrt[3]{1+a}-1}$$

$$\alpha\cdot\beta = \frac{\sqrt[6]{1+a}-1}{\left(\sqrt[6]{1+a}-1\right)\left(\sqrt[6]{1+a}+1\right)}$$

$$\alpha\cdot\beta = \lim_{a\to 0^+} \frac{1}{2}$$

So Ans (B)

Q.44. The equation of a Plane passing ---

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

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

$$\frac{3(1+\lambda)+1(2-\lambda)-1(3+\lambda)}{\sqrt{(1+\lambda)^2+(2-\lambda)^2+(3+\lambda)^2}} = \frac{2}{\sqrt{3}}$$ Sorry.

$$\frac{3+3\lambda+2-\lambda-3-\lambda}{\sqrt{1+\lambda^2+2\lambda+4+\lambda^2-4\lambda+9+\lambda^2+6\lambda}} = \frac{2}{\sqrt{3}}$$

$$\sqrt{3}(\lambda+2) = 2\sqrt{3\lambda^2+4\lambda+14}$$

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(2) $3[\lambda^2+9+4\lambda] = 4[3\lambda^2+\ldots$

$3\lambda^2+12+12\lambda = 12\lambda^2+16\lambda\ldots$

$0 = 9\lambda^2+4\lambda+44$

(3) $\lambda = \frac{-4\pm\sqrt{\ldots}}{\ldots}$