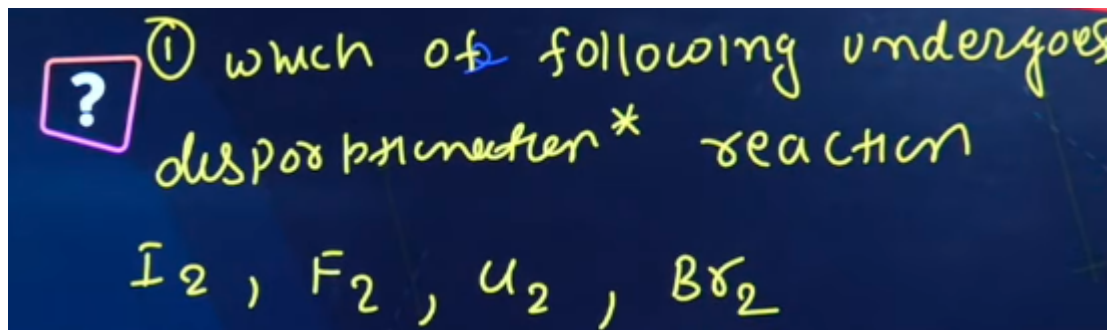
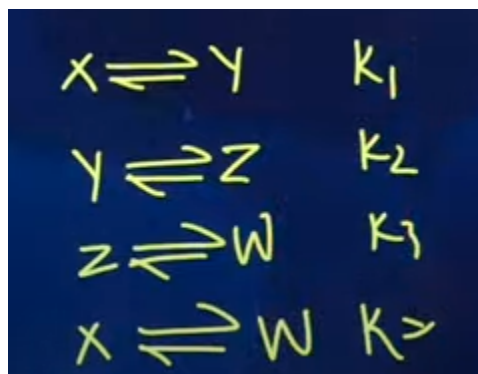


JEE Main Session 2 2024 Apr 8 Shift 1 Memory-Based Questions

Q1



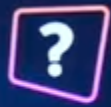
Q2



Q3

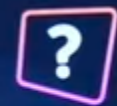
? Find the range of $\frac{\sin^4\theta + 3\cos^2\theta}{\sin^4\theta + \cos^2\theta}$

Q4



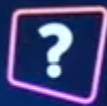
$$A = \begin{bmatrix} 2 & a & 0 \\ 1 & 3 & 1 \\ 0 & 5 & b \end{bmatrix}, A^3 = 4A^2 - A - 21I \quad \text{find } 2a + 3b =$$

Q5



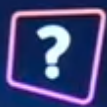
$$\lim_{x \rightarrow 0} 2 \left[\frac{1 - \cos x \sqrt{\cos 2x} \cdot \sqrt[3]{\cos 3x} \cdots 10 \sqrt{\cos 10x}}{x^2} \right] =$$

Q6



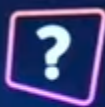
$m_1, m_2, m_3 = 1.2 \text{ kg } 1.6 \text{ kg } 400 \text{ g}$ kinetic energy ^{is same} Find ratio of Linear momentum.

Q7



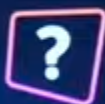
Two charged spheres have radii a, b , then ratio of their charges. if their potential is same?

Q8



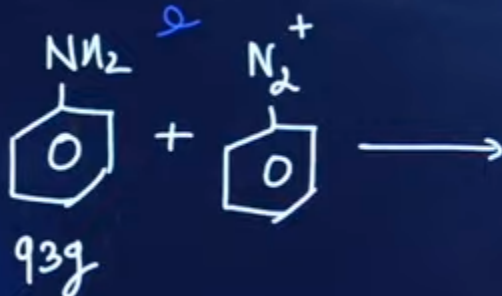
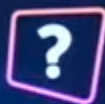
Incident critical angle $\theta = 45^\circ$ find ratio of medium -1 to medium -2

Q9



Magnetic moment in MnO_4^{-2}

Q10



Q11

? A complex $\text{CoCl}_2 \cdot n\text{NH}_3$ gives 2 moles of AgCl when react with AgNO_3 .
Let x be the o.s of Co, find $x+n$

Q12

? If $A = \begin{bmatrix} 2 & -1 \\ 1 & 1 \end{bmatrix}$, Sum of diagonal elements of $A^{13} = 3^n$,
find $n =$

Q13

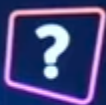
? In a hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = -1$, eccentricity is $\sqrt{3}$ Length of Latus rectum is $4\sqrt{3}$, If $(\alpha, 6)$ Lies on hyperbola. Product of focal distances from $(\alpha, 6)$ is β , then $\alpha^2 + \beta =$

Q14



$f(x) = 4\cos^3 x + 3\sqrt{3}\cos^2 x - 1$ then find the local maxima at point $[0, 2\pi]$

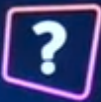
Q15



Let $\alpha = \sum_{r=0}^n (4r^2 + 2r + 1) \times {}^n C_r$ and $B = \left[\sum_{r=0}^n \frac{{}^n C_r}{r+1} \right] + \frac{1}{n+1}$

If $140 < \frac{2\alpha}{\beta} < 281$, then value of n is -

Q16



Find 3 digit numbers using digits ~~0, 2, 4, 6,~~ and ~~7~~ with out repetition and the number cannot be divisible by 3 is ?

Q17



The correct expression for Bernoulli's theorem is (the symbols have their usual meaning)

(a) $P + \rho gh + \frac{1}{2}\rho v^2 = \text{constant}$

(b) $P + \frac{1}{2}\rho gh + \frac{1}{2}\rho v^2 = \text{constant}$

(c) $P + \rho gh + \rho v^2 = \text{constant}$

(d) $P + 2\rho gh + \rho v^2 = \text{constant}$

Q18

? If a stationary particle is cut into two parts of masses m_A & m_B , velocities v_A and v_B then Ratio of KE.

- (1) $v_B : v_A$
- (2) $m_B v_B : m_A v_A$
- (3) $m_B : m_A$
- (4) 1 : 1

Q19

? 2 planets A & B of masses m_1 & m_2 around sun moving in circular orbit of radii r_1 & r_2 respectively. If angular momentum of A is L & B is $3L$. Then, ratio of time period T_A/T_B

- a) $\left(\frac{r_2}{r_1}\right)^{3/2}$
- b) $27(m_1/m_2)^3$
- c) $\frac{1}{2} \left(\frac{m_2}{m_1}\right)^3$
- d) $\left(\frac{r_1}{r_2}\right)^3$

Q20

? Closed pipe and open pipe resonating with same length then ratio of frequencies in 7th overtone is $\frac{a-1}{a}$. Find a .