

JEE Main 24 January 2023 Shift 1 Memory-Based Questions



- The equation of wave is given as  $0.05 \sin (2x - 4t)$ , find the velocity
- Two charges  $q_1$  and  $q_2$  are separated by a distance 'd' and are placed in a medium of dielectric constant  $k$ , if they are placed in the air then find an equivalent distance at which they experience the same force
- The phosphodiester bond of RNA is most stable at?
- A 25 ml buffer solution is prepared by integrating 0.1M of  $\text{CH}_3\text{COOH}$  concentration and  $\text{CH}_3\text{COONa}$  concentration 0.1 M. Calculate the pka of  $\text{CH}_3\text{COOH}$  if the PH of the solution is 5
- Two lines are given as  $x-2$  by  $3 = y-1$  by  $3 = z-0$  by  $2$  and  $x-1$  by  $3 = y-2$  by  $2 = z-1$  by  $3$ . Find out the shortest path/ distance between the lines
- Find the radius of gyration for the uniform solid sphere of radius 5 cm about the axis PQ as shown (a figure was given)
- Arrange in increasing order of hydrogen bonding - A- Ice, B- Pure Water, C- Impure Water
- A circuit was given and it was asked to find out the current through  $R_4$  ( $I_4$ ) and  $R_5$  ( $I_5$ )
- A question related to tension in the string. Two blocks of masses  $m_1 = 4\text{kg}$  and  $m_2 = 1\text{ kg}$  are placed over a smoothly fixed wedge, connected by an ideal string over a smooth pulley. Calculate the tension in the string after the system is released.
- The equation for A parallel to the surface
- Tangent is drawn at a point on the parabola  $y^2 = 24x$ . It intersects the hyperbola  $xy = 2$  at points A and B. Find the AB Locus point
- If A and B are two non-zero matrices and  $A^2 + B = A^2B$ , then, which of the following is true? i.  $A^2B = B A^2$ , ii.  $A = I$  &  $B = I$ , iii.  $AB = I$
- Out of 12 subjects, there are 5 languages and 7 others. 5 languages have to be chosen such that 2 language subjects are chosen
  - 1, 1, 1, 3, 3, 4, 4, 2, 2 - From 9-digit number in which even digits are at even places
  - The correct stability of the resonating structure of (an image given)
  - A question on the correct product of the following reaction is (An image was given)
  - What is the cation that gives a bright red colour with dimethyl glyxomine
  - Find mass % of N in Uracili
  - Statement-based question - SStatement 1 - Noradrenaline is a neurotransmitter in human begins, Statement 2 - Its low concentration is not a cause of depression
  - What is the correct statement about 'Freons'

$$\tan^{-1}\left(\frac{1 + \sqrt{3}}{3 + \sqrt{3}}\right) + \sec^{-1}\left(\sqrt{\frac{8 + 4\sqrt{3}}{6 + 3\sqrt{3}}}\right)$$

$$I = \int_0^3 \frac{\sin^{2023} x}{\sin^{2023} x + \cos^{2023} x}$$

$$\lim_{t \rightarrow 0} = \left[ \frac{1}{1 \sin^2 t} + \frac{1}{2 \sin^2 t} + \frac{1}{3 \sin^2 t} + \dots + \frac{1}{n \sin^2 t} \right] \sin^2 t$$