In a reaction where A+B gives 2C. All of them start form 1 M concentration and $K_c$ value is 100. Find [A] at equilibrium.

The concentration of Fe$^{2+}$ (10 mL) required to oxidize 15 mL of 0.1 M $K_2Cr_2O_7$ solution is:

In the combustion of butane, 72 grams of water is given out, how much butane is formed?

Arrange the following ions in the increasing order of size. Na$^+$, Mg$^{2+}$, Al$^{3+}$.

Which of the following leaches out from the extraction of Al from bauxite?

1. Fe$_2$O$_3$
2. TiO$_2$
3. SiO$_2$
4....

Arrange in increasing order of oxidation numbers. CrO$_3$, MnO$_2$, V$_2$O$_5$, Fe$_2$O$_3$. 
Which of the following do not exist?

1. SiF$_6^{2-}$
2. GeCl$_6^{2-}$
3. Sn(OH)$_6^{2-}$
4. SiCl$_6^{2-}$

Which is water soluble protein

1. Albumin
2. Collagen
3. Myosin
4. Fibrin
Which of the following complexes show attraction or repulsion on external magnetic field

1. \([\text{Co(CN)}_6]^{3-}\)
2. \(\text{Ni(CO)}_4\)
3. \([\text{Ni(CN)}_4]^{2-}\)
4. \([\text{Fe(H}_2\text{O)}_6]^{3+}\)

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Number of sigma bonds in pent-3-en-1-yne \((\text{CH}_3 - \text{CH} = \text{CH} - \text{C} \equiv \text{C-H})\)

S: The solubility of alkaline earth metal hydroxide increases down the group.
Major product of

\[ \begin{align*}
\text{CH}_3\text{CH}_2\text{MgBr} & \quad \text{(i)} \\
\text{H}_2\text{O}, \text{HCl} & \quad \text{(ii)} \\
\end{align*} \]

Increasing order of ionic radii of $\text{Al}^{3+}$, $\text{Mg}^{2+}$, $\text{Na}^+$ and $\text{K}^+$ is

\[ \text{A. } \text{Al}^{3+} < \text{Mg}^{2+} < \text{Na}^+ < \text{K}^+ \]
\[ \text{B. } \text{Al}^{3+} < \text{Na}^+ < \text{K}^+ < \text{Mg}^{2+} \]
\[ \text{C. } \text{Al}^{3+} < \text{K}^+ < \text{Mg}^{2+} < \text{Na}^+ \]
\[ \text{D. } \text{Mg}^{2+} < \text{Na}^+ < \text{K}^+ < \text{Al}^{3+} \]

JEE Main July 25 Shift 1 Physics Questions and Answers

A nucleus of mass $4m$ disintegrates into two daughter nuclei of mass $m$ and $3m$. Find the ratio of their respective De Broglie wavelength?

1:3
3:1
$1: \sqrt[3]{3}$
$1:1$
An electron, proton and alpha particle have same kinetic energy. Find order of de Broglie wavelength.

$\lambda_e > \lambda_p^- > \lambda_\alpha$

$\lambda_{p^+} > \lambda_\alpha > \lambda_e^-$

$\lambda_\alpha > \lambda_{p^+} > \lambda_e^-$

$\lambda_e^- > \lambda_\alpha > \lambda_{p^+}$

Earth moves around sun in elliptical orbit. If minimum and maximum distance between earth and sun are $r_{\text{min}}$ and $r_{\text{max}}$ respectively and minimum and maximum speed of earth are $V_{\text{min}}$ and $V_{\text{max}}$ respectively. Express $V_{\text{max}}$ in terms of others parameters.

$$V_{\text{max}} = \frac{r_{\text{min}} V_{\text{min}}}{r_{\text{max}}}$$

$$V_{\text{max}} = \frac{r_{\text{max}} V_{\text{min}}}{r_{\text{min}} + r_{\text{max}}}$$

$$V_{\text{max}} = V_{\text{min}}$$

In a YDSE setup, the distance between the slits varies as $d = d_0 + A \sin(\omega t)$. What is the difference between the maximum and minimum fringe width?

$$\frac{2\lambda AD}{d_0^2 - A^2}$$

$$\frac{2\lambda AD}{d_0^2 + A^2}$$

$$\frac{2\lambda d_0 D}{d_0^2 - A^2}$$
Two wires of equal dimensions and Young’s modulus $Y_1$ and $Y_2$ are connected end to end. What is the equivalent Young’s modulus for combination.

\[
\frac{Y_1 + Y_2}{2} \quad \sqrt{Y_1 Y_2} \quad \frac{2Y_1 Y_2}{(Y_1 + Y_2)} \quad \sqrt{\frac{Y_1^2 Y_2^2}{2}}
\]

In an amplitude modulator circuit, the carrier wave is given by, $C(t) = 4 \sin (2\pi \times 10^2 t)$ while modulating signal is given by, $m(t) = 2 \sin (2\pi \times 10^4 t)$. Then the bandwidth of the broadcast signal will be -

0.2 MHz

2 MHz

20 MHz

40 MHz

Temperature vs time graphs are given below for 2 substances. Compare specific heat capacity.

$S_A > S_B$

$S_B > S_A$

$S_A = S_B$

Can’t be determined
Find the ratio of the impulse transferred to the wall by a ball incident normally and then at 45° with normal?

- \(1 : 2\)
- \(\sqrt{2} : 1\)
- \(1 : \sqrt{2}\)
- \(2 : 1\)

For a radioactive sample, time taken for quarter of the sample to decay is \(T_1\) and time taken for half the sample to decay is \(T_2\). Find the value of \(T_2 - T_1\).

- \(\frac{1}{\lambda} \ln \left( \frac{3}{2} \right)\)
- \(\lambda \left( \ln \left( \frac{3}{2} \right) \right)\)
- \(\frac{1}{\lambda} \ln \left( \frac{2}{3} \right)\)
- \(\lambda \ln \left( \frac{2}{3} \right)\)

A bulb rated 200W, 100V is connected to 200V supply. What external resistance should be connected in series to have same power as earlier?

- 100 Ω
- **50 Ω**
- 10 Ω
- 5 Ω
x and y are the axes along the diameter of a disk of mass m and radius R. z-axis is perpendicular to plane of the disk.

**Assertion:** → Radius of gyration is same about all three axes.

**Reason:** → All axes are symmetry axes.

Assertion and Reason both are correct and Reason is correct explanation for assertion

Assertion and Reason both are correct but Reason doesn’t explain assertion

Assertion is right and Reason is wrong

**Assertion is wrong and Reason is right.**

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**JEE Main July 25 Shift 1 Maths Questions and Answers**

\[
\lim_{n \to \infty} \left[ 1 + \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{n^2} \right]
\]

Options:

A. 0  
B. 1/e  
C. 1/2  
D. 1

\[
\left(1 + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{n} \right)
\]

\[p = 1\]
The image of the point (3, 5) in line \( x - y + 1 = 0 \), lies on

\[ \text{A} \quad (x - 2)^2 + (y - 4)^2 = 8 \]

\[ \text{B} \quad (x + 4)^2 + (y - 6)^2 = 16 \]

\[ \text{C} \quad \text{D} \]

\[ \frac{\sin \theta \cdot \sin 2\theta (\sin^6 \theta + \sin^4 \theta + \sin^2 \theta)}{1 - \cos 2\theta} \sqrt{2\sin^4 \theta + 3\sin^2 \theta + 6} \]

Ans: \( \frac{1}{18} (2\sin^6 \theta + 3\sin^4 \theta + 6\sin^2 \theta)^{\frac{3}{2}} + C \)

If \( \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \) and \( \frac{x^2}{c^2} + \frac{y^2}{d^2} = 1 \) are orthogonal then relation between \( a, b, c, d \) is:

\[ \text{A} \quad a + b = c + d \quad \text{B} \quad ab = \frac{b + d}{c + d} \quad \text{C} \quad \text{D} \]

\[ A \oplus (B \rightarrow A) \] equal to

\[ \neg A \lor (B \oplus A) \]

\[ \neg A \lor (\neg B \lor A) \]

\[ \text{A} \quad A \rightarrow (A \lor B) \quad \text{B} \quad A \rightarrow (A \land B) \]
\[ \frac{dy}{dx} = \frac{x^2 - 4x + 8 + y}{x - 2} \]

If curve passes through origin, then it also passes through

A. (5, 5)  B. (4, 5)  C. (5, 4)  D. (4, 4)

\[ y = x - \frac{x}{2} \]

The coefficients a, b, c of quadratic equation \( ax^2 + bx + c = 0 \) are obtained by throwing a dice thrice. The probability that it has equal roots is

A. \( \frac{1}{36} \)  B. \( \frac{1}{72} \)  C. \( \frac{1}{54} \)  D. \( \frac{5}{216} \)

\[ b^2 = 4ac \]

- If b = 4, a = 1, c = 1
- b = 3, a = 1, c = 1
- b = 5, a = 1, c = 2
- b = 6, a = 3, c = 3

\[ b = 5 \]

\[ \frac{5}{216} \]