MHT CET 2025 Mathematics Answer key PDF

Chemistry

1. **Option (d):** 4. The strongest oxoacid of chlorine is perchloric acid ($HClO_4$), which contains 4 oxygen atoms.
2. **Option (b):** 430 pm. For a BCC lattice, the relationship is $\sqrt{3}a = 4r$. Given $r = 186$ pm, $a = \frac{4\times186}{\sqrt{3}} \approx \frac{744}{1.732} \approx 429.56$ pm ≈ 430 pm.
3. **Option (c):** 8. In a Body-Centered Cubic (BCC) lattice, the central atom is in contact with 8 corner atoms.
4. **Option:** 1.204×10^{24}. Moles of $CH_4 = \frac{3.2}{16} = 0.2$. One molecule has 10 electrons $(6 + 4)$. Total electrons $= 0.2 \times N_A \times 10 = 2 \times 6.022 \times 10^{23} = 1.2044 \times 10^{24}$.

Mathematics

1. **Solution:** $2\sqrt{\tan x} + C$. $\int \frac{\sqrt{\tan x}}{\sin x \cos x} dx = \int \frac{\sqrt{\tan x}}{\frac{\sin x}{\cos x} \cdot \cos^2 x} dx = \int \frac{\sec^2 x}{\sqrt{\tan x}} dx$. Put $\tan x = t, \sec^2 x dx = dt \implies \int t^{-1/2} dt = 2\sqrt{t} = 2\sqrt{\tan x} + C$.
2. **Option (d):** $\frac{1}{2\sqrt{2}}$. $\tan(\pi\cos\theta) = \cot(\pi\sin\theta) \implies \tan(\pi\cos\theta) = \tan(\frac{\pi}{2} - \pi\sin\theta) \implies \pi\cos\theta = \frac{\pi}{2} - \pi\sin\theta \implies \cos\theta + \sin\theta = \frac{1}{2}$. $\sin(\theta + \frac{\pi}{4}) = \frac{1}{\sqrt{2}}(\sin\theta + \cos\theta) = \frac{1}{\sqrt{2}} \cdot \frac{1}{2} = \frac{1}{2\sqrt{2}}$.
3. **Option (a):** 0. Partial fraction of $\frac{x^4+1}{x(x^2+1)^2} = \frac{1}{x} - \frac{2x}{(x^2+1)^2}$. Integrating gives $\ln|x| + \frac{1}{1+x^2} + C$. Comparing coefficients, $A = 1, B = 1$. Thus, $A - B = 0$.
4. **Option (b):** (0, 0). From $x + y + z = 0$ and $xy + zx + zy + 9 = 0$, we find $(x + y + z)^2 = x^2 + y^2 + z^2 + 2(xy + yz + zx) = 0 \implies x^2 + y^2 + z^2 = 18$. The points lie on a sphere centered at origin; the circumcenter of the intersection with $x + y + z = 0$ is the origin.

Physics

1. **Option (b):** 20 m. Using $v^2 = u^2 + 2as \implies 0 = (20)^2 - 2(10)h \implies 20h = 400 \implies h = 20$ m.
2. **Option (a):** 0.05 J. Energy $U = \frac{1}{2}CV^2 = 0.5 \times (10 \times 10^{-6}) \times (100)^2 = 5 \times 10^{-6} \times 10^4 = 0.05$ J.
3. **Option (c):** Radially inward. For a particle in uniform circular motion, the acceleration (centripetal) is always directed toward the center.