MHT CET 2026 Mathematics Answer Key PDF

Chemistry

1. Option (b) Density, Temperature
   Explanation: Intensive properties do not depend on the quantity of matter present. Both density and temperature are characteristic of the material itself rather than its amount, making them intensive properties.

2. Option (b) C_6H_5CHO
   Explanation: The Cannizzaro reaction is undergone by aldehydes that lack α-hydrogen atoms. Among the options, benzaldehyde (C_6H_5CHO) has no α-hydrogens, allowing it to undergo this self-oxidation-reduction reaction.

3. Option (c) $\Lambda_m = \frac{\kappa \times 1000}{C}$
   Explanation: Molar conductivity (Λ_m) is defined as the conducting power of all ions produced by dissolving one mole of electrolyte. When concentration C is in mol L^{-1} and conductivity κ is in S cm^{-1}, the standard formula is given by option (c).

4. Option (b) Increase
   Explanation: Upon diluting an electrolyte solution (reducing concentration C), both strong and weak electrolytes show an increase in molar conductivity due to increased ionic mobility and degree of dissociation.

5. Option (a) 7.2 g cm^{-3}
   Explanation: In a BCC lattice, $Z = 2$ and $a = \frac{4r}{\sqrt{3}} \approx 400$ pm $= 4 \times 10^{-8}$ cm. Substituting these along with $M = 56$ g mol^{-1} into the density formula $\rho = \frac{Z \cdot M}{a^3 \cdot N_A}$ yields approximately 7.2 g cm^{-3}.

Mathematics

6. Option (b) $2 + \frac{2}{\sqrt{e}} - \frac{2}{e^2}$
   Explanation: Integrating the function term-by-term yields $\left[2\sqrt{x} - 2e^{-x/2}\right]_1^4$. Substituting the upper and lower limits into this integrated expression simplifies directly to $2 + \frac{2}{\sqrt{e}} - \frac{2}{e^2}$.

7. Option (b) $-\frac{1}{1+xe^x} + C$
   Explanation: Multiplying the numerator and denominator by e^x and substituting $t = 1 + xe^x$ decomposes the integral. The algebraic part of the integrated function is $-\frac{1}{1+xe^x} + C$, which matches Option (b).

8. Option (d) $\frac{12}{5}$
   Explanation: Differentiating $h(x)$ using the chain rule gives $h'(x) = \frac{4f'(x)+3g'(x)}{2\sqrt{4f(x)+3g(x)}}$. Substituting the given values at $x = 1$ yields $\frac{12+12}{2\sqrt{16+9}} = \frac{24}{10} = \frac{12}{5}$.

9. Option (a) $\frac{1}{\sqrt{1-x^2}}$
   Explanation: Substituting $x = \sin\theta$ simplifies the expression inside the inverse sine to $\sin(\theta + \phi)$, where $\cos\phi = 5/13$. This reduces the function to $y = \sin^{-1} x + \phi$, whose derivative is $\frac{1}{\sqrt{1-x^2}}$.

10. Option (c) $-\frac{2}{3}(\cot^{-1} x^3)^2 + C$
Explanation: Using the substitution $u = \cot^{-1}(x^3)$, the differential is $du = -\frac{3x^2}{1+x^6}dx$. The integral simplifies to $-\frac{4}{3}\int u\, du = -\frac{2}{3}u^2 + C$, which yields option (c).

11. Option (b) $\frac{\pi}{4}$
Explanation: Applying the definite integral property $\int_0^a f(x)dx = \int_0^a f(a-x)dx$ converts $(\cot x)^{101}$ into $(\tan x)^{101}$. Adding the two forms of the integral yields $2I = \int_0^{\pi/2} 1\, dx = \frac{\pi}{2}$, hence $I = \frac{\pi}{4}$.