

MHT CET 2026 Mathematics Answer key PDF

Mathematics

1. **Option (c)** $5/4$

Explanation: Letting $z = x + iy$, equating imaginary parts gives $y = 1$. Equating real parts yields $\sqrt{x^2 + 1} + x = 2 \implies x = 3/4$, which gives the magnitude $|z| = \sqrt{(3/4)^2 + 1^2} = 5/4$.

2. **Option (b)** -4

Explanation: Since the two vectors are perpendicular, their dot product is zero ($\vec{a} \cdot \vec{b} = 0$). Substituting the components gives $2(p) + 1(2) + 3(2) = 0 \implies 2p = -8 \implies p = -4$.

Chemistry

3. **Option (c)** $7 \times 10^{-7} \text{ mol dm}^{-3}$

Explanation: For a binary electrolyte like AgBr, the solubility product is given by $K_{sp} = s^2$. Solving for molar solubility gives $s = \sqrt{4.9 \times 10^{-13}} = \sqrt{49 \times 10^{-14}} = 7 \times 10^{-7} \text{ mol dm}^{-3}$.

4. **Option (c)** 1.0 M

Explanation: Using the Henderson-Hasselbalch equation: $\text{pH} = \text{p}K_a + \log \left(\frac{[\text{Salt}]}{[\text{Acid}]}\right)$. Substituting the values $5.5 = 4.5 + \log \left(\frac{[\text{Salt}]}{0.1} \right)$ gives $\log \left(\frac{[\text{Salt}]}{0.1} \right) = 1 \implies [\text{Salt}] = 1.0 \text{ M}$.

5. **Option (c)**

Explanation: The combined gas law combines Boyle's law ($PV = \text{constant}$) and Charles's law ($V/T = \text{constant}$) to state that the ratio of the product of pressure and volume to temperature is constant, yielding $\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$.

6. **Option (c)** London dispersion force

Explanation: Dinitrogen (N_2) is a symmetrical, homonuclear diatomic molecule with no permanent dipole moment. Consequently, the only intermolecular forces acting between these non-polar molecules are London dispersion forces.

7. **Option (b)** $(4, 2, 1, 1/2)$

Explanation: For a $4d$ orbital, the principal quantum number $n = 4$ and the azimuthal quantum number $l = 2$. Option (b) uniquely matches these criteria with a valid magnetic quantum number $m_l = 1$ and spin quantum number $m_s = 1/2$.

8. **Option (a)** $\text{CO} + \text{H}_2$

Explanation: Water gas is an industrial fuel gas prepared by passing steam over red-hot coke at high temperatures (1270 K). It consists of an equimolar mixture of carbon monoxide (CO) and hydrogen gas (H_2).

9. **Option (a)** 0.2 mole of solute is dissolved in 250 ml

Explanation: Electrolytic conductivity (κ) depends on ion concentration and increases with higher concentration due to more ions per unit volume. The concentration here (0.8 M) is the highest among all the options.

Physics

10. **Option (b) entirely used to do work**

Explanation: In an isothermal expansion, temperature is constant, so the change in internal energy is zero ($dU = 0$). By the first law of thermodynamics ($dQ = dU + dW$), all the supplied heat is converted into work ($dQ = dW$).

