

1. **Question:** A car accelerates uniformly from rest to a speed of 30 m/s in 10 seconds. What is the distance covered by the car during this time?
2. **Question:** A block of mass 2 kg is sliding down a frictionless incline of height 5 m. What is its speed at the bottom of the incline?
3. **Question:** A 0.5 kg ball is thrown vertically upward with a speed of 20 m/s. How high will it rise before coming to a stop?
4. **Question:** Two identical charges of  $+2\text{ }\mu\text{C}$  are placed 0.5 m apart. What is the force between them?
5. **Question:** A 5 kg object is moving with a velocity of 10 m/s. What is its kinetic energy?
6. **Question:** A spring with a spring constant of 200 N/m is compressed by 0.1 m. What is the potential energy stored in the spring?
7. **Question:** A 10 kg object is lifted to a height of 2 m. What is the gravitational potential energy gained?
8. **Question:** A wave has a frequency of 500 Hz and a wavelength of 0.5 m. What is the speed of the wave?
9. **Question:** A circuit has a resistance of 10 ohms and a current of 2 A. What is the voltage across the circuit?
10. **Question:** A 1 kg mass is attached to a spring and oscillates with a period of 2 seconds. What is the spring constant?

**Q1. Predict the major product of this Favorskii rearrangement of 1-bromo-2-cyclopentanone.**

**Q2. Name the product formed in the syn-dihydroxylation of cyclohexene using OsO<sub>4</sub>.**

**Q3. Identify the product of electrocyclic ring opening of cyclobutene under thermal conditions.**

**Q4. What is the product of the reaction: (CH<sub>3</sub>)<sub>3</sub>CCH<sub>2</sub>Br treated with NaNH<sub>2</sub> in liquid ammonia?**

**Q5. What is the major product formed when acetophenone undergoes aldol condensation under basic conditions?**

**Q6. Predict the geometry and magnetic moment of the complex [Cr(NH<sub>3</sub>)<sub>4</sub>Cl<sub>2</sub>]<sup>+</sup>.**

**Q7. What is the final product when Fe(CO)<sub>5</sub> is treated with excess trimethylamine-N-oxide?**

**Q8. Why does the complex [Cu(NH<sub>3</sub>)<sub>4</sub>]<sup>2+</sup> adopt square planar geometry, while [Zn(NH<sub>3</sub>)<sub>4</sub>]<sup>2+</sup> is tetrahedral?**

**Q9. What colored compound is formed when K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> reacts with H<sub>2</sub>SO<sub>4</sub> and H<sub>2</sub>O<sub>2</sub>?**

**Q10. Which complex is more stable: [Co(NH<sub>3</sub>)<sub>6</sub>]<sup>3+</sup> or [CoF<sub>6</sub>]<sup>3-</sup>? Justify your answer.**