A jet lands on an aircraft carrier at ~220 km/h. Its acceleration is (1) g if it stops in 2.0 s. The jet travels about (2) meters while stopping. g=10 m/s²

A satellite is in a circular orbit 600 km above the Earth's surface, where g=7 m/s². The radius of the Earth is 6400 km. The speed of the satellite is (3) m/s.

An elevator car has a mass of 500 kg and is carrying passengers having a combined mass of 246 kg. The minimum horsepower (hp) delivered by the motor to lift the elevator car at a constant speed of 2.0 m/s is (4) hp. 1hp=746 W; g=10m/s²

A glass window has a total glass area of 3 m² and the thickness of the glass is 3 mm. If the temperature difference between its faces is 10 °C, the rate of heat transfer by the conduction through the window is (5) watts. The thermal conductivity of glass is 0.8 W/m°C.

A uniform rod of length L and mass M is free to rotate on a frictionless pin passing through one end. The rod is released from rest in the horizontal position. Its angular speed when it reaches its lowest position is (6) rad/s.

A proton is accelerated through a potential difference of 200 V and enters a uniform B field of 1 Tesla directed perpendicular to its velocity. Its velocity is about (7) m/s and the radius of its path is (8) meters. M_p=1.67x10⁻²⁷ kg

(9) A conventional lightbulb is marked “100W at 120 V” is screwed into a socket at one end of a long extension cord in which each of the two conductors has a resistance of 0.8 Ω. The other end of the extension cord is plugged into a 120-V outlet. Draw a circuit diagram, and find the current and the power delivered to the bulb in this circuit.

(10) Walking on a street, you hear a frequency f₁ from a siren of an approaching ambulance with speed v₀. After the ambulance passes, you hear a frequency f₂. Draw a schematic diagram of the wave fronts emitted from a moving source, and determine if f₁>f₂ or f₂>f₁.

(11) Draw a schematic diagram of an ac generator and explain briefly how it works.

(12) Draw the Pressure-Volume diagram for the Carnot cycle and describe how a Carnot engine works.