1. What is Gyroscopic effect on Stability of four wheel Drive moving in a Curved path

2. The turbine rotor of a ship has a mass of 8 tonnes & a radius of gyration of 0.6m. It rotates at 1800 rpm. clockwise, when looking from the front of the stern. Determine the Gyroscopic couple, if the ship travels at 100km/h and steers to the left in a curve of 75m radius.

3. A four-wheeled trolley car of mass 2500kg runs on rails, which are 1.5m apart, and travels around a curve of 30m radius at 24km/h. The rails are at the same level. Each wheel of the trolley is0.75m in diameter and each of the two axles is driven by a motor running in a direction opposite to that of the wheels at a speed of five times the speed of rotation of the wheels. The moment of inertia of each axle with gear and wheel is 18kg-m^2. Each motor with shaft and gear pinion has a moment of inertia of 12kg-m^2. The center of gravity of the car is 0.9m above the rail level. Determine the vertical force exerted by each wheel on the rails taking into consideration the centrifugal and Gyroscopic effects. State the centrifugal and gyroscopic effects on the trolley.

4. Find the angle of inclination with respect to the vertical of a two wheeler negotiating a turn. Given: combined mass of the vehicle with its rider 250kg;moment of inertia of the engine flywheel 0.3kg-m^2;moment of inertia of each road wheel 1kg-m^2; Speed of engine flywheel 5 times that of road wheels and in the same direction :height of center of gravity of rider with vehicle 0.6m; two wheeler speed 90km/h; wheel radius 300mm;radius of turn 50m

5. The turning moment diagram of a petrol engine is drawn to the following scales: Turning moment, 1mm = 5 N-m; crank angle, 1 mm = 1^0. The turning moment diagram repeats itself at every half revolution of the engine & the areas above & below the mean turning moment line taken in order are 295, 685,40, 340, 960,270 mm^2 . The rotating parts are equivalent to a mass of 36 kg at the radius of gyration of 150 mm. Determine the co efficient of fluctuation of speed when the engine runs at 1800 rpm

6. The turning moment diagram of a multi cylinder engine is drawn to the following scales: Turning moment, 1mm = 600 N-m vertically;& 1mm = 30 horizontally, The intercepted areas between the output torque curve & the mean resistance line, taken in order from one end, are as follows : +52 -124, +92, -140, + 85, -72 & +107 mm^2. When the engine is running at a speed of 600 rpm. If the total fluctuation of speed is not to exceed± 1.5 % of the mean, Calculate the necessary mass of the flywheel of radius 0.5 m

7. Determine Energy stored in Flywheel

8. The mass of flywheel of an engine is 6.5 tonnes and the radius of gyration is 1.8 meters. It found from the turning moment diagram that the fluctuation of energy is

56KN-m. If the mean speed of the engine is 120r.p.m.Find the maximum and minimum speeds

9. What is the effect of gyroscopic on naval ship

10. The heavy turbine rotor of a sea vessel rotates at 1500r.p.m. clockwise looking from the stern, its mass being 750kg. The vessel pitches with an angular velocity of 1 rad/s. Determine the gyroscopic couple transmitted to the hull when bow is rising, if the radius of gyration for the rotor is 250 mm. Also show in what direction the couple acts on the hull?

11. The flywheel of a steam engine has a radius of gyration of 1m and mass 2500kg. The starting torque of the steam engine is 1500 N-m and may be assumed constant. Determine: 1.the angular acceleration of the flywheel, and 2. The kinetic energy of the flywheel after 10 seconds from the start.

12. Explain the effect of the gyroscopic couple on an aeroplane